VOL. L. NO. 197.] [JANUARY, 1941.

MIND

A QUARTERLY REVIEW

OF

PSYCHOLOGY AND PHILOSOPHY

I.—OTHER MINDS (II.).

"BUT THIS IS DIFFERENT."

BY JOHN WISDOM.

Black. We can never really be certain what is going on in the mind of another. Even if a man, when given a gold watch, showed every sign of being delighted and never, before or afterwards, not even to his most intimate friends, gave us any ground to suppose he was anything but what he then appeared to be, it would still remain possible that he was not delighted. And by the same reasoning, even were parrots or monkeys to talk like people at a party it would remain possible that they neither thought nor felt, and there is nothing illogical in supposing that a friend's body should continue to nod, smile and talk just as before he went to sleep, although now his mind and soul are no longer in his body—the body keeps up the old habits—there is nothing logically absurd about this idea any more than there is anything logically absurd about the idea that though his body is still in death his mind is active, thinking and feeling in some other world.

White. You might as well say we can't be certain there aren't leprechauns in watches. You might as well say we can't be certain that any current runs in electric wires. You might as well say we can't be certain that there's any energy in live batteries, as say we can't be certain that there's any consciousness in live bodies.

Black. But this last is different. It is, of course, absurd to ask when a watch shows no pecularities whether it isn't perhaps leprechaun guided. And it is also absurd to ask whether a battery contains a charge when it possesses just those peculiarities which people describe by saying that it's charged. It is even absurd to ask whether a man is dead when his body continues to show no sign of life, and no one expects it to. Or rather, it is absurd to ask this if what you mean by " dead " is " no longer in the body, no longer driving it ". But it doesn't follow that the man doesn't exist anywhere, disembodied or in a new body. It is " I shall be dead to-morrow " in this disembodied sense which provides " a first-class puzzle for the positivists ".[1] For how could it be verified ? I know indeed what it would be like to watch my own funeral—the men in tall silk hats, the flowers and the face beneath the glass-topped coffin. But " To-morrow I shall be no more " doesn't mean to me merely this account of what you'll see if you're at the cemetery in time. To prove that " There's a current in this wire " means no more than " This wire is connected to a battery at one end and rings bells at the other " is not to prove that " There's a soul in this body " means no more than " This body converses intelligently ", much less is it to prove that " The soul of this body exists somewhere " means no more than " You can wake him if you shake him ".

White. We haven't proved anything at all. We haven't proved that it is absurd for the philosophical scientist to ask " Is there a leprechaun in this watch ? ", " Is there a current in this wire ? " We have only reminded ourselves of the things everyone knows about the way these sentences work and described these things so as to make these " questions " " answerable ". There is a difference between these questions and " Is there a soul in this body ? " But, as so often happens, you are under-concerned about the cases which don't trouble you at the moment, and over-concerned about the one that is striking you at the moment. We have seen in what ways " The watch shows all signs of being animated by an invisible leprechaun, but is it really ? " *does* do something like registering a doubt ; and we have seen how " Is there a brownie or a leprechaun within ? " *does* come near to opposing *two* hypotheses which are therefore not both identical with " This watch sings fairy songs and disappears on Midsummer night, etc." The philosophical scientist who asks " Are there leprechauns within the leprechaun-watches ? ", " Are there entelechies in living things ? ", " Are there currents in electric wires ? ", is not

[1] Dr. A. C. Ewing, MIND, July, 1937, p. 353.

being merely absurd. True, it is queer to ask, "Is there an invisible current in this wire?" when both (1) the wire shows all features which have been present wherever we have before applied the expression "an invisible current runs through this wire", *and* (2) we can't explain what would more encourage us to believe that an invisible current is present. Certainly that is queer. At the same time, one can understand the scientist's feeling it difficult to say that the electrical symptoms the wire exhibits entail that an invisible current runs through it. It isn't a recognised principle of logic that if a thing gives off sparks, rings bells and drives trams then an invisible current runs through it. If you like, it *is* a logical principle that a wire giving such symptoms is "electrically charged". That expression you may well say just sums up the symptoms. But to say that a current runs through it—that is going further, and the philosophical scientist excusably expresses hesitation about saying that the symptoms entail the presence of a current. If he says he doubts whether even in cases where all the symptoms are present a current really runs, he is deciding against saying that the symptoms entail the current. No one has ever seen one and then, to take a different sort of consideration, if it is a current that flows it is a very knowing sort of current. For, unlike water or any sort of current, it knows before it enters a channel whether the channel is clear. It is as if when a wire is connected with a battery the wire becomes alive and willing to serve us in certain ways and apt to harm us in others.

But there is another point. I am astonished at your lack of sympathy with those who say that perhaps Smith is in his dead body though he will never move again.[1] To say this is, after all, no more absurd than to say that he is still somewhere. True, he is showing no sign of being in his body. But then he is showing no sign of being anywhere, anywhere in the world. If you think it possible that he's still somewhere, isn't it possible that he's still in his body, and that if you mummify it he will play possum there for ever.

If Socrates is still alive, he is quite invisible. And when you die if you are still alive you will be quite invisible. And surely one of the places you may be in is your body. So after all is it absurd to say "His body shows no signs of life and I know it isn't going to, but whether his soul is still in his body I don't know"? Surely it is no more absurd than saying that his body shows no sign of life but perhaps he exists *somewhere*. Or, if

[1] Rupert Brooke, *Doubts*. "For if the soul be not in place, what has laid trouble in her face?"

you like, surely it is only *more* absurd. I mean that there is no difference in principle. It is only a degree more absurd for me to say "There are unicorns in Piccadilly" than it is for me to say "There are unicorns somewhere". In both cases I can make excuses when we can't find the unicorns. I can say that there are unicorns in Piccadilly but that they are made of ectoplasm which can be seen only in infra-red rays and that ordinary matter such as buses and taxis goes right through it. It is only easier to make excuses for "There are unicorns somewhere". I just say "Piccadilly is not the place for them". You say, "What about the Brighton Road?" I say, "No, not the Brighton Road, but perhaps at the Pavilion". If we also fail to find any at the Pavilion, and even in Ethiopia, then people will begin to lose interest in my statement that unicorns are still extant; and if people who haven't heard me say this before are astonished and interested, then those who have will warn them, saying, "White's unicorns are *very* hard to find", or "Yes, White's unicorns exist somewhere—in heaven you understand", or "White's unicorns exist—at the point of infinity".

Black. Ah! if all that is meant by "in his body" is mere presence without any action, then it *is* a serious question whether Smith is in his body. It's only when we use "in his body" as most people use "still in the body", meaning "still shows all the usual signs of life", that it is absurd to ask, "Is Smith in his body? His heart has ceased to beat, there is no sign of life and will be none, but is he still in the body?" In a use in which Smith's being in his body means that he is driving it such a question is absurd. But of course when no such activity is implied, then "Does Smith exist, and is he still seeing out of his body or dreaming?" is a serious question, like "Are people unconscious under chloroform or are they perhaps terribly conscious though they always quite forget it afterwards?" It all depends on what you mean by[1] "Is Smith in his body?"

[1] This last remark is a heart-breaking one. It is a complication especially prevalent in modern times. Again and again we have (1) philosophers who say "$s_1 \ldots s_n$ entail or are identical with Σ", and (2) philosophers who deny this. Sometimes we have (3) those who say "There is a sense of 'Σ' in which $s_1 \ldots s_n$ entail Σ and a sense in which they don't". They are nearer a proper view of the dispute than those in (1) and (2). But just because of this it is harder to show what is wrong with their idea of it. Every question, *Does P entail Q?* (Is a tomato a fruit or a vegetable?), is a matter of what is meant by 'P' and 'Q' and that not merely in the way in which an empirical question *Is every P a Q?* is a matter of what is meant. For *Does P entail Q* depends *only* on what is meant. But it doesn't *depend on* what is meant, it *is* a question of what is meant. Con-

White. But mightn't one just as well say that if all one means by 'leprechaun haunted' is 'sings fairy songs, etc.', *then* it is absurd to ask "This watch sings fairy songs, etc., but is it leprechaun haunted?" but if one means more, then it is not absurd.

Black. No, that is different. What we have seen in the leprechaun case is that "There is an invisible leprechaun within this watch" has a meaning different from "This watch sings fairy songs, etc.", but that this difference is such as to make the question "This watch sings fairy songs, etc., but is it leprechaun haunted or brownie haunted or not haunted at all but just wonderful?" not a question as to which of several hypotheses is correct but a request as to which of several mnemonic pictures to employ. In this way, as you put it, the question "Is there a leprechaun within?" is not answered nor found to have two answers. It vanishes. The anxious doubt becomes a cheerful indecision as we see the inappropriateness of the interrogative form. But with an ambiguous question the interrogative form is not inappropriate. Thus, in the case of "Is Smith's soul in his body?", the interrogative form is appropriate, it is only that there should be two instead of one if conversation is to go forward without confusion. In the ordinary somewhat loose use of language we say when we know that a man will never move again that his soul has left his body. And in this sense it is absurd to ask "Has his soul left his body?" when you know he will never move again. But in this case, as opposed to the invisible leprechaun case, there is left another sense of "Is his soul perhaps still in his body?" which is a serious question. It is the question whether his sensations and feelings are going on just the same though now he can show no signs of them owing to a complete paralysis. The scientist who talks about a current running

sequently, to answer *It depends on what you mean by 'P'* or *It depends on what you mean by 'Q'* does nothing towards answering the question *Does P entail Q?* It only reformulates it as *Does 'P's' meaning include the meaning of 'Q'?* or, if you like, *Does 'P' stand for something which entails Q?* And if the answer given is *'P' stands for one thing which entails Q and for another which doesn't,* then one must ask, *Have you any reason for saying this except that some of us here and now wish to say that P entails Q while some of us do not?* In cases of *philosophical* difficulty, e.g. *Does no sign of life entail Smith is not in his body?*, the answer must be *That is my only reason.* But then the answer to the question *Some of us are inclined to say that P entails Q, some that it doesn't.—Which is right?* becomes *If 'P' and 'Q' were used as some of us are now inclined to use them then the answer would be P does entail Q, and if they were used as some others of us are inclined to use them, then the answer would be P does not entail Q.*

through an electric wire isn't serious about the current. He is, of course, serious, sober, as contrasted with one who is telling a fancy " In the clock on the stairs lives a hobgoblin ", or one who says " There's a demon in my watch ". But his sobriety arises solely from those purposes which his sentence serves, which could be as well served by a sentence which doesn't mention a current but employs some other convenient metaphor for reminding and warning us of the peculiar properties of this wire. And it is the same with " The sea is angry " and " Neptune is stirring up the sea ". People who say these things aren't serious. They know they are only " making-a-story-of-the-facts ", like your governess who, when the gate conveniently blew open before you, said " A kind fairy opens the gate for you ". But one who, when Smith frowns, says " Smith is angry ", is serious, and is not merely " making-a-story-of-the-facts " about Smith's behaviour. He is making a claim which goes beyond the behaviour, and may thus be in serious doubt when the behaviour is not in doubt. And "Is it that Smith sees the Union Jack in red, white and blue or does he see it black, green and yellow ? " are *two* serious alternatives.

White. Again, you do not sympathize enough with the cases which aren't striking *you now*. The primitive scientist who says " Puck is in the churn ", although he doesn't at all expect to see anything, is serious, like the Greeks who held there were spirits in the trees. Quite as serious as those who say " God drives the world ". Would you call them serious ? Would you call this question serious : " Is the world controlled by a God who often forgets or by a Devil who sometimes relents ? " Or would you say " No, this is only a matter of what picture you employ to vent your attitude to the world like you vent your attitude to your watch " ? And remember that very unprimitive, very sophisticated scientists say that, though of course they seriously believe that men think, they aren't serious when they say that dogs do, because they have discovered that dogs are really just complicated machines, so that when they say a dog has learned that a bell means meat they just mean that his saliva runs when the bell rings. These scientists don't expect anything different of dogs from what the rest of us expect. But they represent themselves as having lost their childish faith in dogs. Others again, moving in the opposite direction, say that they are convinced that flowers feel.

Black. Those who say that dogs don't think or feel, and those who say that flowers do are both serious. And even the modern theologian is serious. True, he is quite unlike the primitive

believer in God, who believes that the floods have been sent by God, and thinks that if he prays before he sets about trying to save the sheep that will make a difference to the number of sheep he saves. The modern theologian knows that that is only an anthropomorphic superstition, and he no more expects sacrifice or prayer to make any difference to the number of sheep saved than does an atheist.

White. Perhaps the modern theologian has different expectations of the next world.

Black. Not the most modern ones. They regard hope of personal immortality as another childish feature of primitive belief. But they seriously believe that something is going on now other than the processes of nature, namely, the supervising mental processes of a super-being. And this is what makes their question serious. This is what you either can't or won't understand.

There is, of course, some difficulty about drawing the line between serious psychological statements such as "Smith is angry" and unserious ones such as "The sea is angry", "My motor-cycle is in a bad mood this morning", or (shall we add ?) "I suppose the flowers feel better for the sun".

Nevertheless, just as "A current runs through this wire" provides a picture only because it is in other cases a serious assertion that a current is running through a thing, so do "The sea is angry", "Neptune is angry", provide pictures only because "The bull is angry", "Smith is angry" are serious.

White. Steady. There's a difference here. There's not the same difference between a serious psychological statement and a non-serious one as there is between a serious physical statement and a non-serious one. I feel inclined to say "Flowers feel pain when they are shrivelled by frost" doesn't involve any picture apart from a picture of shrivelling flowers. Now "There is a leprechaun in the watch" does involve another picture besides the watch's singing songs, a picture of a leprechaun.

Black. Well, but don't you get an organic image of the pain the flowers feel ?

White. Yes, only somehow this is different in a way we have already noticed.[1]

Suppose that from where we lie we can see hats and heads above a low hedge, moving smoothly along. Then if I say "They are moving with the current" I speak seriously, because

[1] MIND, October, 1940, p. 378, section 10.

XUM

a picture [1] of liquid flowing is connected in the following way with what I aim to do by uttering my sentence: I aim to get you to expect to see a liquid corresponding to that picture. Suppose that we can see as we look at the blood in a vein little red bodies moving along but on no visible current. Then, if I say "They are moving on a current", someone may say "It's an invisible one, then", thus drawing attention to a peculiarity in the connexion between my words and pictures on the one hand and my claims on the other. When I say "Yes, but not quite invisible" and hand him a stronger microscope which shows the red bodies floating on a clear liquid, then I draw attention to a likeness between (*a*) the connexion between *my* words and pictures and *my* claims, and (*b*) the *ordinary* connexion between the sentence "They are on a current" and the claims made by one who utters it. Because of this likeness we may say that I am still seriously speaking of a current. We come to the case when I am not speaking seriously of a current. This is when I have in mind no means, not even eccentric means like microscopes, for seeing or feeling the current. When I am not speaking seriously, then it becomes absurd to speak of more direct evidence for my claim that a current is present, because my claim has come to include only the indirect signs of the presence of a current; I mean no more, I assert no more, and so my assertion cannot be supported by finding other signs. And by the same fact it is unshaken by their absence.

Now if this is what is meant by the distinction between serious and not serious statements then we must call *all* psychological statements not serious. For with all of them all the guiding pictures are not connected with the claims made in such a way as to allow us to speak of directly verifying the statement by finding the reality which fits the guiding picture.

Let us run over the way in which a sentence, *e.g.* "There is a dagger in the air", may pass from a physical to a psychical use. Suppose Smith says "There is a dagger in the air", then in the ordinary way I look up and expect a sensation to fit the image of a dagger which his sentence perhaps gave me. But maybe very queer things have been happening of late. One week everybody

[1] Of course I need not have had such an image or picture when I spoke. In that case we must describe the difference between my speaking seriously of a current and speaking "metaphorically", "fictitiously", of a current in some other way. One might say that when I speak seriously, I aim to produce expectation in you which will be in fact the same as those who expect to see a liquid corresponding to the picture, in other words, expect to see a current.

passing a certain place would get a wound showing the teeth marks of an animal. Another week everybody passing a certain place would get a wound such as a burning torch would make. Another week everybody passing a certain place would get a wound such as a dagger would make. It has become the custom to say in a horrified voice that there's a wolf's head, a burning torch, or a dagger at the place, according to which group of phenomena appears. Suppose now Smith says in the usual horrified voice, " There's a dagger in the air ". I don't now expect a sensation of a dagger nor do I expect sensations of others saying they have a sensation of a dagger. Of course not. I know it to be an invisible dagger. But the word ' dagger ' and the picture of a dagger guide me as to what to expect. I expect a different sort of wound when people say " There's a dagger in the air " from what I expect when they say " There's a torch in the air ".

Suppose now that Smith is an inmate of a mental hospital. Morning after morning he has some frightful hallucination. This morning he shouts, " There's a dagger in the air ". I don't take this seriously in the sense that I expect to get a sensation of a dagger in the air nor a sensation of other people, dogs, cameras, or wire hoops saying " There is a dagger in the air ". The sentence still gives me a picture of a dagger and not a torch, and this picture still guides me, but now it guides me only with regard to Smith. That is, it guides me only with regard to the sensations I shall get from looking at and listening to Smith and what I shall see and hear if I watch and listen to people who are watching and listening to Smith. This is what makes it a psychological, subjective statement. At least it makes it a psychological, subjective statement for me though not for Smith if Smith expects us all to see his dagger. As to whether his statement was objective because it was objective for him who made it or subjective because it was subjective for him who heard it, I leave it to you to decide. Let us say it was a false objective statement though it truly told us what Smith saw, or that it was false about the contents of the real physical world but true about the contents of Smith's mind. Suppose, lastly, that Smith knows very well that he is subject to hallucinations when he wakes, and only says to us " There's a dagger in the air " because we are his doctors, and we like to know what form the hallucination takes each morning. Then, though the sound he makes is like that he made when he was making an objective statement with " There's a dagger in the air ", nevertheless what he is doing is like what is done by one who says " It looks to me

just as if there's a dagger in the air, but that's nothing to go by, I've been so queer of late". Here again the sentence gives a guiding picture, but now no one expects to see anything to fit the picture, and no one, not even Smith, expects anyone to see anything to fit the guiding picture.

Black. I see what you are getting at. It is what you have been getting at all along. You want to say "There's a dagger in the air" when used by Smith as a psychological statement, as a purely subjective statement, is only a way of telling us about what Smith will say he sees, about what he will draw if asked to draw what he sees, about what he will point to if asked to point to examples of the sort of thing he sees, in short, about what we may expect in the way of behaviour from Smith. You want to say that like "There's a dagger in the air", used to predict a pattern of wound-sensations in oneself and others, and like "There's an invisible leprechaun inside", used to predict a pattern of song and disappearance sensations, so is "Smith sees an hallucinatory dagger" used to predict a pattern of sensations from Smith, a different sort of pattern, a psychological pattern, but for all that a pattern of what can be seen and heard. For it is used to predict what Smith will say he sees, what he will draw if asked to draw what he sees, what he will point to if asked to point to examples of what he sees. And you want to say that all psychological statements are unserious in that the guiding picture which goes with them, though it guides like the picture of the invisible leprechaun, guides only in that way. You want to say that the utterance of a psychological sentence doesn't ever lead one to expect any sensation corresponding to the one it primarily brings to mind. Thus, "Smith sees the Tricolour in red, white and blue" doesn't lead one to expect any sensation of red, white and blue whether one looks up to the sky or into Smith's brain, and "Smith feels sick" doesn't lead one to expect a sensation of sickness.

Nevertheless, somehow, you must allow, there is a difference between a serious and a non-serious psychological statement. Among physical and semi-physical statements there are (i) some which would usually be called "half-joking" or "not serious", as when the father says, "The wolves are gaining", or someone says, "There must be a demon in this house, the way I lose things"; there are (ii) others which have just now been called unserious because of a certain likeness to the unserious ones,—such statements as "There is a current in this wire". These are semi-serious, because though part of what you might expect from "There's a current in this wire is not to be expected", part

of it is to be expected, namely, what we should call a pattern of reaction such as one would expect if one knew that really there was a current running through it (or a leprechaun within); and (iii) there are fully serious physical statements such as "A slate has fallen off the roof". With psychological statements, too, there are what would ordinarily be called non-serious ones as, for example, "A goblin lives in the clock on the stairs", "My motor cycle is very fickle". The latter isn't quite unserious, it tells you how irregular in response is the speaker's motor-cycle. And there are, of course, serious psychological statements such as "Evangeline is cross". And then there are the semi-serious psychological statements corresponding to the semi-serious physical statements about invisible leprechauns and currents. I refer to statements about unconscious feelings. When an analyst tells you that Smith hates his mother and you protest that he doesn't, that you have asked him, then the analyst smiles like the scientist smiled when you looked with a magnifying glass for the current in the wire. The analyst smiles and says, "Not a conscious wish" (not a visible current).

White. This just confirms what I say. I may now put my point in this way. Unlike goats and leprechauns, *all* feelings are invisible. The analyst's invisible feeling is called invisible, not because only indirect criteria are relevant to the truth of his statement, for that is true of any statement about a feeling, in the sense that one cannot feel with one's own senses whether Smith has a feeling,[1] but because some of the indirect criteria usually counted are not to be counted. Just as our seeing nothing when we look for a current in a wire is prevented from counting against the statement "A current is now running through it", by the saving phrase "an invisible current I mean of course", so is Smith's denial that he hates his mother prevented from counting against the analyst's statement that he does, by the saving phrase, "an unconscious wish, of course". But in the latter case it is not that direct criteria for the statement have been dropped; they never have been used. Or, if you like, since it is not that there are direct criteria which might have been used and have not, let us say that the distinction between direct and indirect criteria doesn't apply here, in other words, that we have not provided a use for the phrases, 'psychological statement directly verified', 'psychological statement only indirectly verified'.

[1] Or should one say, "We can imagine, of course, and in fact it has happened, that one person has felt with his own senses another's feeling"?

When we went over the uses of " There's a dagger in the air " we saw when this physical looking statement became psychological. It was when no dagger sensations or lack of them was relevant to it but only a pattern of sensations from Smith who uttered it and people looking at Smith. Now if this is all the claim it makes, it is absurd when you get these sensations to say " Still I don't know whether it is true, still maybe it isn't true ".

Black. But this is just the point. *Is* that all the claim it makes ? It makes, in addition to the claim that you and others will get a certain sensation on looking at Smith, the claim that Smith is having a certain sensation.

White. Isn't the meaning of a statement a matter of its effect on hearers ? Now " Smith sees the Union Jack in red, white and blue " puts a picture of a Union Jack into the heads of hearers, but if it is purely psychological and subjective it does not lead them to expect Union Jack sensations but only (1) sensations of Smith saying in all languages (mouth, pen and paint brush) that he sees the Union Jack, and (2) sensations of people saying that Smith sees the Union Jack. This *is* its claiming that Smith is having a certain sensation, *viz.*, a Union Jack sensation. " Smith sees the Union Jack in red, white and blue " puts a picture of a Union Jack into a hearer's head. And for Jones to ask when he has these sensations from Smith and from people looking at Smith, " Does Smith see the Union Jack ? ", is a joke. Jones is like one who, when it is well known how we use " leprechaun haunted ", nevertheless asks " Is there really a leprechaun in this watch ? " even after he has heard it sing and found it disappear on Midsummer night. He relapses to a use in which there are not only outer but also inner signs of the presence of X, in this instance a leprechaun. It is like someone who, though he knows that by submicroscopic structure we mean a structure not visible by any microscope, nevertheless asks " *Has* this such and such a sub-microscopic structure ? True, it shows the outward signs of this, but has it ? " He asks a question which feels sensible because in other cases in which one speaks both of outward signs and inward explaining presence there is sense in saying "The outward signs are here but shall we find the usual inward presence ? " In other cases we have explained the different reactions of two like things by guessing at different things inside them and often these guesses have been correct but sometimes incorrect. But when the assertions, " There's a dagger in the air ", " This stuff has such and such a structure ", make no claim beyond those peculiarities of the air and the stuff which they are posited to explain, then having found these peculiarities, it would be absurd

to ask, " Is there a dagger in the air ? ", " Has this stuff an x structure ? "

Black. You keep saying the same thing in different words. The point is, " Smith sees the Union Jack in red, white and blue, that's why he says he does, that's why he draws one when you ask him to draw what he sees ", is a different sort of explanation from " An electric current runs through it ", " There's a leprechaun within ", " It has such and such a sub-microscopic structure ".

I am quite prepared to allow, of course, that any matter of the meaning of a sentence must appear in the effects it has on its hearers or in the effects its speakers intended it to have on its hearers. I am prepared to go further and say that even when the effects on hearers of two sentences are different in a way which makes it incorrect to say they mean the same, nevertheless the difference is not such as to give sense to the question, " Which is correct ? ", unless the two sentences lead to different expectation of sensation. Thus " There is a leprechaun within ", " There is a brownie within ", have different meanings, but, in the usages we have described, there was no sense in " Shall I bring you a watch with a leprechaun inside or one with a brownie inside ? " But what I insist upon is that " Smith sees the Union Jack in red, white and blue and talks like the rest of us ", and " Smith sees the Union Jack in black, red and yellow, and calls colours by different names from the rest of us ", *do* lead to different expectations. In other words, I insist that your account of the effects on a hearer of a psychological sentence was not adequate. Not only does " Smith feels sick " raise in my mind a faint sensation of sickness which, though I expect no copy of it, nevertheless serves to guide me in what I expect of Smith. It does something else as well. It leads me to expect *for* Smith a sensation of sickness, a sensation if you like corresponding to my faint sensation of sickness. And this is connected with another inadequacy of yours. You said, " There isn't a difference between serious and unserious psychological statements in the way there is between serious and unserious physical statements, because no one ever expects a sensation to fit the principal picture that goes with ' Smith feels sick ', ' Smith feels as if he sees the Union Jack ' ". But it isn't true that *no* one does. Smith does. If Smith overhears " We must take out Smith's teeth or he'll be colour-blind by to-morrow ", this doesn't in Smith as it does in us merely produce a picture of frocks, faces, flags and landscapes all in grey, guiding us to expectations of his muddling his job as a signalman and being unable to tell the Belgian flag from the Tricolour. On

the contrary Smith looks at the poppies in the corn and says "No more of this, only this" and he looks at a colourless engraving, and so doing he expects. Not only has he pictures of things in grey, but he *expects with* these just as we *expect with* our pictures of Smith crashing the trains. The sentence, "Smith will be colour-blind", in so far as it is positive, leads in Smith at least to an expectation of a sensation which copies the engraving and, in so far as it is negative, prevents expectation of a sensation copying a coloured picture. It's serious for him. The description of its influence on his expectation is not complete when we have told how he expects to muddle the trains and the flags, for it also effects his expectations in a way it effects no one else's. And with these facts that "Smith will be colour blind" is serious for him, and affects his expectations beyond behaviour goes the the fact that he can directly verify it, that the distinction between directly verifying and indirectly verifying the statement has an application for him. And as I said, you gave an inadequate account of the effect on us of the statement, "Smith will be colour-blind to-morrow". Not only does this statement lead us to expect him to muddle the trains and the flags, it also leads us to expect *for him* sensations corresponding to the engraving, although the only sensations it leads us to expect *for ourselves* are sensations from his muddling the trains and flags and things. And when to-morrow Smith crashes the trains, confuses the flags, and fails with Holmgrens wools, and we still ask, "Is he colour-blind?", then we shall be wondering whether our expectation *for him* has been fulfilled.[1]

And this after all is only to be expected, in view of the fact that "Smith will be colour-blind to-morrow" certainly means more to Smith than any story, however complete, about his confusing flags, crashing trains, etc. For if it is allowed that it thus means more to Smith than any story about behaviour, it must be allowed that it also means more to us, unless it is claimed that though Smith speaks English, "Smith will be colour-blind to-morrow" has for him a different meaning from what it has for us.

White. You have brought out an incompleteness, a relevant incompleteness, in my account of how the working of a sentence passes from a physical to a purely psychical working. As you

[1] It may here be added, "And when we wish we could know, we are wishing our powers of knowing of mental states were increased so that we could know directly the states of others as we know our own", *cf.* our wishing that our powers of discriminating weight were increased so we could tell directly, as well as by the visual clue of scales, whether feathers differ in weight.

say, " Smith will be colour-blind to-morrow " means more to Smith than that he will mishandle the jobs we entrust to him, it is serious for Smith in another way, it gives further expectations besides the expectations of mishandling jobs.

Black. Yes. So even if we count as relevant to the meaning for a person of a sentence only what expectations it gives and prevents in him we shall still have to say that there is a difference in meaning between, on the one hand, " You will crash the trains, confuse the flags, and so on to-morrow because you will see everything in greys ", and, on the other hand, " You will see reds and greens and blues the same as ever to-morrow, but you will crash the trains and confuse the flags and fail in tests and say you see everything grey *just* as if you were colour-blind ". For these two sentences have different effects on the expectations *of the one to whom they are addressed.* So does " You will be blind to-morrow " prevent expectation in the person to whom it is addressed in a way in which " You will act just as if you were blind " does not. So does " To-morrow you will be no more "—the only pure negative—prevent expectation in the person to whom it is addressed in a way in which it does not in others, and in a way in which " To-morrow your body will lie still " does not. In general, the more a statement " S is or will be P " is psychological, and even such a physiological statement as " I shall be swimming to-morrow " is a bit psychological, the more does it raise or prevent expectations (for himself) in a hearer who is S, different from those it raises or prevents (for themselves) in hearers who are not S.

White. That's so. When a man who has recently had his tonsils out says to you, just as you are being wheeled off to have yours out, " You'll be given chloroform, so you won't show any sign of feeling anything, but you will all the same, although many people forget all about it when they come round ". Then his saying that will have a different effect on you from what his saying " You will be under chloroform, you'll feel nothing " would have had. The fears the latter would have soothed the former raises. Your expectations as you reach the theatre are very different from what they might have been.

Black. And so are the expectations of your friends. They expect you to lie quite still, but now they can't help fearing for you that you will be feeling it all the time. Not only your friends, but as you say, all those who speak English will understand what you understand by " You'll feel everything just the same, although you will lie so quiet under the anæsthetic ". And since this certainly means something to you and alters

your expectations from what they were when you had been told that you would lie still and feel nothing, it also means something to them, alters their expectations. And this is so although their expectations of what you'll *do* aren't altered. Likewise, " Smith will be colour-blind " plays on his hopes and fears, alters his expectations, in a way in which " Smith will confuse the flags, crash the trains, fail in all tests, and never turn on people and say, ' I was having you on ' " does not. True, " You'll be in tears in a minute " means as much as " You'll be unhappy in a minute ". But that's only because " You'll be in tears in a minute " isn't really merely a description of behaviour, but is really a semi-psychological statement. And if it were used merely as a description of behaviour so that the speaker added, " and there will be no tear gas about nor onions near, nor pepper in your eyes ", then, however much information of this sort were added, it would never have the same meaning as " You will be unhappy in a minute ". A person who hadn't ever been unhappy even if he understood all about the onions and the gas couldn't understand " You'll be unhappy ". Some children know very well like doctors the symptoms of being in love and use it of just the right people. But we say, " They don't really understand, they don't fully understand. They've never been in love ". Of course, when they shall have been in love then they will understand, and its just then that " I am sure Jack will fall in love with Joan " or " I am sure you will fall in love with Joan " comes to mean more to them than " He will call with flowers ". It is just then that " Jack will fall in love " makes a difference to their expectations in a way in which " He will call with flowers " does not, unless, of course, it does, because it has become a hidden psychological statement. That is to say, when they understand " Jack will fall in love ", " Jack will be unhappy ", " Jack will see a dagger ", then they understand what he understands by this, then it affects their expectations in the way in which it affects his. Now, as I have admitted, only when ' love ' came to mean to Jack more than a motor in the moonlight did he understand what love is and only when it does this too for the other children, do they understand.[1] The point is, they don't understand " He'll fall in love " until it means to them what it means to the person it is about when he understands " You'll fall in love ". In other words, when they do understand

[1] This could be expressed by saying, " Only when a motor in the moonlight came to mean to him more than a motor in the moonlight did he come to understand love, and only when it came to mean more to them too did they too come to understand love ".

then it means to them what it means to the person it is about. And as we have already seen that it means more to him than any story about behaviour, and does this because it leads in him to different expectations from those any prediction of behaviour leads to, it follows that when they understand " He'll fall in love " it means to them also more than any story about behaviour, leads in them to different expectations. And your solicitous friend, if he knows English and understands " You'll feel it all ", will, like you, expect you to feel it all, however quiet you lie. In general, when other people understand a psychological statement such as " Smith will see an hallucinatory dagger to-morrow ", the statement means to them more, leads them to expect more, than any story about how Smith will look and what he'll do.

But now, since how Smith looks, what he does, and what he would do are the most that any of us ever really know about him, it follows that we don't ever really know what his state of mind is, and wouldn't know even if we were a great deal better informed about how he looks and so on than we ever are.

White. This conclusion is as shocking as the denial of the premisses which led to it. Never know that a child is pleased ? never know that a man is worried ? I'd sooner say that all that " Smith is in pain " means to people who aren't Smith is that Smith is wounded or sick and groans. No doubt " Smith will be in pain by to-morrow " has a different effect on a hearer from " Smith will be complaining of pain by to-morrow ", and a very different effect from " This body (Smith's) will be complaining of pain by to-morrow ". But, after all, " There's a leprechaun in this watch " has a different effect from " This watch sings fairy songs and disappears on Midsummer Night ", and " Through this wire runs a current of power " has a different effect from " This wire is attached to a battery at one end and a tram at the other and the tram moves ". Were we to allow this difference to make us say, " The presence of the current is one thing, its effects another ", then we should have people saying, " When one reflects on what it is one really knows about electricity one has to confess that one doesn't ever really know that it takes the form of a current. All one knows is that certain wires exhibit a regular pattern of electrical phenomena ". At once others will say, " Nonsense. To know the latter is to know the former ". Now, what we saw in this case was that this conflict between Sceptics and Phenomenalists is removed not by proving the one wrong and the other right, but by investigating certain of the causes of each one's saying what he does. And what we found was that a careful description of those differences between the

use of "There's a current in this wire" and "If this wire is attached to a tram, a bell or a light they will go", which led the Sceptic to say, "The current is one thing, its manifestations another; we know only the manifestations"—a careful description of these differences leaves us quite willing to say of "This wire rings a bell, drives a tram, etc., but is there an invisible current in it?" that it is not a real question. At the same time, a careful description of those likenesses between the use of "There's a current in this wire" and "If this wire is connected to a bell, etc.", which led the Phenomenalist to say, "To carry a current just is to exhibit a certain stimulus-reaction pattern", leaves us willing to say that it is not a merely verbal question. The two careful descriptions are the same. For a careful description of the likenesses involves, *e.g.* noting their differences from the likeness between a sentence in one language and its translation in another, and it involves, *e.g.* noticing how there are circumstances in which it is conventional to answer "Is there a current in this wire?" with "I don't know", when it is not conventional to answer in this way the question "Does the wire give the electrical reactions?" The circumstances are those in which the wire responds in some typical electrical ways and fails to respond in others. And a careful description of the differences will involve these points, but if it's careful it will involve also explaining that the differences are quite unlike the differences between "A current of water runs in this pipe" and "The events at either end of this pipe exhibit a hydraulic stimulus reaction pattern". It will emphasise the likeness of the question, "Is there a current in this wire?", asked when the wire gives all signs of such a current, to the question, "I suppose the poor old average man takes shelter when the siren goes. But why should he, for he can hardly be killed can he?" And isn't this the right procedure in the controversy "Surely consciousness is something more than its bodily manifestations? And yet is it?"? However often it is proved that "Smith will be colour-blind" means more than that he will crash the trains, etc., and that it means the same to the rest of us as it does to Smith, people will return to the assertion of the paradoxical opposites of these conclusions. Every time I take his pieces by the rules of chess he replaces them on the board. Maybe it's not chess he's playing. And why not? Do we want everlastingly to be reminded of what we do say? Do we want everlastingly forced upon us that particular grouping of the infinity of individuals which results from the use of the most usual linguistic machine? So many of us welcome philosophical paradoxes because in them

we find what we "have often thought but ne'er so well expressed".

Philosophy has been described by Wittgenstein as descriptive, and Stephenson and Wisdom do something towards elaborating this in MIND, 187 and 188. (Note here the Idiosyncracy Platitude, "The only *correct* answer to a metaphysical question, 'What is an X?' is 'An X'".) This comparison of "What is a philosopher?", "What is an art critic?" to "What is a reptile?", "What is love?" is first rate. But the last questions you will notice are best answered by the poets. And they are allowed poetic licence. They don't rely wholly on that. That technique is blended with the detailed description of the concrete occasion.[1] But they don't hesitate to say that love is what it's not, a disease, a religion, a moment of immortality.[2] And, saying what they say, we can feel why they say what they say. And that's enough. The poetry of love, of God, of woman, is not an incorrect reply to a question, nor even an incomplete reply, though it's never finished.

Saying what they say, we can feel why they say it. That's how to settle the dispute "In love does the individual die or is he born into a new life?" That is how we settled the disputes about the average man, the invisible leprechaun, the invisible current and the wind. These conflicts were all of the form: "It is something other than its manifestations, we know only these, so we can't know its nature or existence", versus "We know its existence and nature—east or west, positive or negative, irritable or amiable, still courageous or not—we know only its manifestations, so it must be these".[3] They were dissolved by entering into them. Surely the conflict: "Consciousness is other than its bodily manifestations—'Smith will be colour-blind' means more than 'Smith will fail in colour tests'—in others we know nothing but these manifestations, so we can't know its nature or existence in others" versus "We know that Bobby feels sick and therefore of the nature and existence of consciousness, in others we know only its manifestations, so it must in others at least be nothing but its manifestations", can be dissolved in the same way? Can't we come to see that though "He has a picture in his head" differs in meaning from "He acts just as if he had a picture in his head" this difference is

[1] "Therefore the love which us doth bind", Marvel, *Definition of Love*; "Once did my thoughts both ebb and flow", Anon, *The Heritage of Poetry*, p. 80.

[2] R Browning, *The Spell*. "O moment, one and infinite."

[3] W. E. Johnson, *Logic*, Part II, p. 81.

so different from the difference between "He has a stone in his bladder" and "He acts as though he has a stone in his bladder", that though the latter difference prevents knowledge of the symptoms giving knowledge of the cause the former difference does not? In this way we should come to see that though knowledge of a picture in Smith's mind is not like knowledge that a picture is in a room when we have looked, it is also not like "knowledge" that a picture is in a room when we haven't looked but might have. In this way we should come to see how "Smith gives all signs of having a mental picture in his head but has he?" is a mock question which is the first move in the game of describing the peculiar use of "mental picture" as opposed to the use of "valuable picture", just as "This gives all signs of carrying an invisible current but does it?" is a mock question which is the first move in the game of describing the peculiar use of 'invisible current' as opposed to 'swift current'.

Black. But, for the seventy-seventh time, these cases are different. In the case of the current and also in the case of the leprechaun we could say that the difference in meaning between "There's a current in this wire" and "This wire gives all signs of carrying a current" is such as to make the question "This wire gives all signs of carrying a current but is there one, there's none to be seen?" a mock question, because we could say that the dispute, "This wire carries an invisible current", "No. It gives all signs of carrying a current but it doesn't", is not a factual dispute when the disputants are agreed upon *all* the signs. And we could say this because we could say that when the disputants agreed utterly upon literally all the signs past, present and to come, then the dispute reflected no difference in expectation but only a difference in notation and mnemonic picture.

Now, what we have just recalled is, (1) that "Smith will be colour-blind to-morrow" means more to Smith than "To-morrow Smith will give all signs of being colour-blind", and that this difference in meaning is a difference in the expectations the two sentences lead to; (2) that "Smith will be colour-blind to-morrow" doesn't mean something different to us from what it means to Smith. It follows that "Smith will be colour-blind to-morrow" means more to us than "To-morrow Smith will give all signs of being colour-blind". And that this difference in meaning is a difference in expectation. We noticed that we say that children don't fully understand a statement to the effect that another person has a certain feeling until they have felt that feeling themselves and thus would know what to expect if told that they

were going to feel that way to-morrow and thus know what to expect for a man who is told that he will feel that way to-morrow. Consequently, the dispute as to whether to-morrow behind a face and behaviour, *e.g.* smiles and clever talk, there will or will not be a mental process, is a real question; because one who says there will be and one who says there will not be have different expectations. And this is the mark of what even you deign to call serious, genuine, real questions. Now, the trouble is that the only expectations about the fulfilment of which the disputants will be able to make sure to-morrow are the expectations of the smiles and clever talk, of the sights and sounds, they *both* expect. That is, they will not know whether what further the one expected and the other did not, did or did not come about. One can never really know what is going on in the minds of others.

(*To be continued.*)

II.—MILL'S TREATMENT OF GEOMETRY—A REPLY TO JEVONS.

By Reginald Jackson.

Within five years of the death of John Stuart Mill, the *Contemporary Review* accepted a series of articles by W. Stanley Jevons. The series was entitled "John Stuart Mill's Philosophy Tested", and its purpose was to expose "the disconnected and worthless character of his philosophy".[1] In pursuit of this purpose Jevons decided "to select a certain number of his more prominent and peculiar doctrines, and to show that, in their treatment, he is illogical".[2] The first article selected "Mill's doctrines concerning geometrical reasoning".[3]

Published in December, 1877, it drew a rebuke from the Editor of Mind as early as January, 1878. So prompt an intervention could do little to vindicate Mill's reputation. Indeed, after questioning the utility of Jevons' project on the ground that "those who think most highly of Mill" were "perfectly familiar with all the inconsistencies that Prof. Jevons would now laboriously bring to light",[4] Croom Robertson was hardly at liberty to contest the substance of Jevons' indictment. It is true that Croom Robertson soon grew restive under this self-imposed restraint. But his belief that there was "no need to spend many words on the objections brought by Prof. Jevons against Mill's view of geometrical science"[5] prepared an easy triumph for Jevons in the ensuing number of Mind.

Croom Robertson did detect a major error. He declared the proposition that 'if these imaginary lines are not perfectly straight they will not enable us to prove the truths of geometry' to be "a premiss for which Mill is not in the least responsible"; and he protested that "of course Mill would allow nothing of the sort". His declaration and his protest are justifiable. But his attempt to justify them is ill considered: "In denying (with whatever reason) that straight lines really exist, Mill never says that we have no perception of things as apparently straight.

[1] *Pure Logic and other Minor Works*, p. 202. [2] *Ibid.*, p. 204.
[3] *Ibid.* [4] Mind, 1878, p. 142. [5] *Ibid.*, p. 143.

So, when he comes to deal with the imaginary lines by which he supposes the geometer able to increase his experience indefinitely, he may very well say that these exactly resemble the lines that are perceptibly (without being really) straight ".[1] To this Jevons was able to retort triumphantly: " That is to say, Mill after having made geometrical reasoning the crucial test of his philosophy, having written several laborious chapters on the subject, and having had seven opportunities of revising those chapters in new editions, leaves us still to judge of his doctrine, not by what he has so abundantly said, but by what he has left unsaid ".[2]

A further suggestion was more fortunate only in escaping the eye of Jevons: " Did he not from the first declare, with Dugald Stewart, that there is a purely hypothetical element in the definition of geometrical figures, and that it is this, and not anything we can actually see or imagine, that enables us to prove the truths of geometry? "[3] This suggestion ignores Mill's divergence from Stewart. Having completed his defence of Stewart against Whewell, Mill proceeds: " But though Dr. Whewell has not shaken Stewart's doctrine as to the hypothetical character of that portion of the first principles of geometry which are involved in the so-called definitions, he has, I conceive, greatly the advantage of Stewart on another important point in the theory of geometrical reasoning; the necessity of admitting, among those first principles, axioms as well as definitions ". The relevance of this divergence is shattering: " The axioms . . . differ from that other class of fundamental principles which are involved in the definitions, in this, that they are true without any mixture of hypothesis ".[4] What, then, enables us to prove *these* truths of geometry? " It remains to inquire, what is the ground of our belief in axioms—what is the evidence on which they rest? I answer, they are experimental truths; generalizations from observation. The proposition, Two straight lines cannot inclose a space . . . is an induction from the evidence of our senses ".[5] Mill's answer is precisely what Croom Robertson says it is not.

Those, then, " who think most highly of Mill " must dissociate themselves from Croom Robertson's precipitate intervention. Others are only too likely to find, in these desperate expedients of counsel for the defence, an involuntary confirmation of the substance of Jevons' indictment. In 1890 Jevons' articles were republished in the volume, *Pure Logic and other Minor*

[1] MIND, 1878, p. 143. [2] *Ibid.*, p. 285. [3] *Ibid.*, p. 143.
[4] *System of Logic*, Book II, chap. v, § 3. [5] *Ibid.*, § 4.

XUM

Works. They have been widely read; and they have persuaded many that "Mill's mind was essentially illogical".[1] The charge is plausible. Just because Mill writes so very intelligibly, his inconsistency is easily detected and is never mistaken, as is the inconsistency of other philosophers, for profundity. Moreover, partly because of his capacity for sympathising with conflicting doctrines, partly because of his lack of leisure for revision, Mill's work is full of inconsistencies. Those "who think most highly of Mill" can admit this without admitting that "Mill's mind was essentially illogical". But they must beware of professing to be "perfectly familiar with all the inconsistencies that Prof. Jevons would now laboriously bring to light". For to admit the presence of the inconsistency which Jevons thought he had found in "Mill's doctrines concerning geometrical reasoning" *would* involve the admission that "Mill's mind was essentially illogical". The presence of *this* inconsistency I shall try not to *explain* but to *disprove*. Jevons thought he had found it only because his own mind was *essentially uncritical*. In seeking the hospitality of MIND for an article which can advance philosophy only by inducing philosophers to read Mill less censoriously, I am fortified by the pretext that I am trying to finish what its first Editor began.

What is the inconsistency imputed to "Mill's doctrines concerning geometrical reasoning"? Jevons formulates the indictment as follows:

"As a first test of Mill's philosophy I propose this simple question of fact—Are there in the material universe such things as perfectly straight lines? We shall find that Mill returns to this question a categorical negative answer. There exist no such things as perfectly straight lines. How then can geometry exist, if the things about which it is conversant do not exist? Mill's ingenuity seldom fails him. Geometry, in his opinion, treats not of things as they are in reality, but as we suppose them to be. Though straight lines do not exist, we can experiment in our minds upon straight lines, as if they did exist. It is a peculiarity of geometrical science, he thinks, thus to allow of *mental experimentation*. Moreover, these mental experiments are just as good as real experiments, because we know that the imaginary lines exactly resemble real ones, and that we can conclude from them to real ones with quite as much certainty as we conclude from one real line to another. If such be Mill's doctrines, we are brought into the following position:—

[1] *Pure Logic, etc.*, p. 201.

"1. Perfectly straight lines do not exist.

"2. We experiment in our minds upon imaginary straight lines.

"3. These imaginary straight lines exactly resemble the real ones.

"4. If these imaginary straight lines are not perfectly straight, they will not enable us to prove the truths of geometry.

"5. If they are perfectly straight, then the real ones, which *exactly* resemble them, must be perfectly straight: *ergo*, perfectly straight lines do exist." [1]

In recognition of the gravity of this indictment Jevons remarks: "It would not be right to attribute such reasoning to Mill without fully substantiating the statements. I must therefore ask the reader to bear with me while I give somewhat full extracts from the fifth chapter of the second book of the *System of Logic*." And by copious quotation Jevons contrives that Mill shall seem, given a fair hearing, to convict himself. But quotation can be copious without being liberal. Mill is not given a fair hearing. Jevons so selects his extracts as to suppress whatever is inconveniently relevant, including the key to the extracts themselves.

Jevons is, moreover, confused about the nature of the reasoning attributed to Mill, confused both about Mill's problem and about Mill's solution. "How then can geometry exist, if the things about which it is conversant do not exist?" There are more ways than one in which the possibility of geometry might seem to be endangered. How can geometrical propositions be *meaningful?* How can they be *true?* How can they be *evident?* The problem demands specification. More immediately relevant to the imputation of inconsistency is the nature of Mill's solution. "Mill's ingenuity seldom fails him." But the ingenuity is not Mill's. Mill merely inherits the device to which he has recourse. And Jevons' imputation of inconsistency is the immediate consequence of a complete misunderstanding of this device.

If no real things exactly conform to geometrical definitions, how can geometrical propositions be meaningful? Of this problem a solution has been sought in the doctrine that some imaginary things exactly conform to geometrical definitions and that geometrical propositions are about these. This solution is both popular and plausible. But nobody would attempt to combine this solution with the claim that imaginary things must resemble real things in those respects in which real things

[1] *Pure Logic, etc.*, p. 205.

fail exactly to conform to geometrical definitions. Anyone who thought that Mill adopted this solution would have to suppose that Mill's claim that "we know that the imaginary lines exactly resemble real ones" is to be understood with an implicit reservation. But Mill formulates this solution only in order to reject it. From the second paragraph of § 1 [1] Jevons quotes:

"It is acknowledged that the conclusions of geometry are deduced, partly at least, from the so-called Definitions, and that those definitions are assumed to be correct descriptions, as far as they go, of the objects with which geometry is conversant. Now we have pointed out that, from a definition as such, no proposition, unless it be one concerning the meaning of a word, can ever follow; and that what apparently follows from a definition, follows in reality from an implied assumption that there exists a real thing conformable thereto. This assumption, in the case of the definitions of geometry, is false: [2] there exist no real things exactly conformable to the definitions. There exist no points without magnitude; no lines without breadth, nor perfectly straight; no circles with all their radii exactly equal, nor squares with all their angles perfectly right. It will perhaps be said that the assumption does not extend to the actual, but only to the possible, existence of such things. I answer that, according to any test we have of possibility, they are not even possible. Their existence, so far as we can form any judgment, would seem to be inconsistent with the physical constitution of our planet at least, if not of the universe." At this point Jevons breaks off the quotation. Fortunately, he cannot prevent others from hearing Mill out:

[1] *System of Logic*, Book II, chap. v.

[2] Jevons observes (p. 206, note 2) that in the later editions Mill substitutes for the word '*false*' the words '*not strictly true*'. Later, Jevons calls this (p. 213) a "curious substitution" and says that "a good many remarks might be made upon this little change of words, were there not other matters claiming prior attention". One shudders at the thought of the remarks which Jevons, had his attention been free, might have made. Holding that a condition is not exactly fulfilled, Mill describes the assumption that this condition is fulfilled as '*false*'. On revision, he thinks that the assumption is less misleadingly, because more specifically, described as '*not strictly true*'. Is this change "curious"? And is it indicative of anything but a wholesome desire to be understood?

Jevons also insists (p. 212): "Any one who has the least knowledge of geometry must know that a straight line means a *perfectly* straight line". Had Jevons faced the implication that, if 'straight' always means 'perfectly straight', then 'perfectly straight' must mean 'perfectly perfectly straight'?

"To get rid of this difficulty, and at the same time to save the credit of the supposed system of necessary truth, it is customary to say that the points, lines, circles, and squares which are the subject of geometry, exist in our conceptions merely, and are part of our minds; which minds, by working on their own materials, construct an *à priori* science, the evidence of which is purely mental, and has nothing whatever to do with outward experience. By howsoever high authorities this doctrine may have been sanctioned, it appears to me psychologically incorrect. The points, lines, circles, and squares which anyone has in his mind, are (I apprehend) simply copies of the points, lines, circles, and squares which he has known in his experience. Our idea of a point, I apprehend to be simply our idea of the *minimum visibile*, the smallest portion of surface which we can see. A line, as defined by geometers, is wholly inconceivable. We can reason about a line as if it had no breadth; because we have a power, which is the foundation of all the control we can exercise over the operations of our minds; the power, when a perception is present to our senses, or a conception to our intellects, of *attending* to a part only of that perception or conception, instead of the whole. But we cannot *conceive* a line without breadth; we can form no mental picture of such a line: all the lines which we have in our minds are lines possessing breadth."

That in this passage Mill rejects the imaginary object solution will hardly be questioned. But it might be urged that, since Jevons is mainly concerned to prove that "Mill's mind was essentially illogical", he need not be disconcerted by Mill's rejection of the imaginary object solution in this passage, provided that he can establish Mill's adoption of this solution in other passages. Even so, Jevons' failure to discuss this passage would not be explained. Either this passage must shake his conviction that Mill elsewhere adopts the imaginary object solution, or he ought to adduce this passage as direct evidence of Mill's incoherence instead of contenting himself with the indirect evidence which he finds in Mill's claim about the resemblance between imaginary and real lines.

How did Jevons become convinced that Mill adopts the imaginary object solution? The passage which Jevons offers in evidence I do not yet examine. For I cannot imagine how that passage could be interpreted as Jevons interprets it by anyone not already independently convinced. The origin of Jevons' conviction must be sought elsewhere and is, I think, to be found in a complete misunderstanding of the very passage whose discussion he evades.

XUM

Mill's rejection of the view, that imaginary things come nearer than do real things to satisfying geometrical definitions, is accompanied by a concession:

"We can reason about a line as if it had no breadth; because we have a power, which is the foundation of all the control we can exercise over the operations of our minds; the power, when a perception is present to our senses, or a conception to our intellects, of *attending* to a part only of that perception or conception, instead of the whole." Mill is at pains explicitly to deny that what he concedes implies what he withholds:

"But it is an error to suppose, because we resolve to confine our attention to a certain number of the properties of an object, that we therefore conceive, or have an idea of, the object, denuded of its other properties. We are thinking, all the time, of precisely such objects as we have seen and touched, and with all the properties which naturally belong to them; but, for scientific convenience, we feign them to be divested of all properties, except those which are material to our purpose, and in regard to which we design to consider them." [1]

To say this is only to occupy the well-known stronghold designed by Berkeley [2] for the defence of Nominalism against the Conceptualism of Locke. Abstraction is conceded; abstract ideas are rejected. Nothing, whether real or imaginary, need have (or lack) the properties which things may be thought of as having (or lacking).

On this concession of the possibility of abstraction Mill bases his solution of the problem of the meaningfulness of geometrical propositions. Those who are unable to distinguish the possibility of abstraction from the possibility of abstract ideas will be unable to distinguish Mill's solution from the imaginary object solution. But Mill at least clearly seeks a different solution:

"Since, then, neither in nature, nor in the human mind, do there exist any objects exactly corresponding to the definitions of geometry, while yet that science cannot be supposed to be

[1] End of third paragraph of § 1.

[2] *Principles of Human Knowledge* (Third Edition), Introduction, § 16: "And here it must be acknowledged that a man may consider a figure merely as triangular, without attending to the particular qualities of the angles, or relations of the sides. So far he may abstract; but this will never prove that he can frame an abstract, general, inconsistent idea of a triangle. In like manner we may consider Peter so far forth as man, or so far forth as animal, without framing the forementioned abstract idea, either of man or of animal, inasmuch as all that is perceived is not considered." *Cf.* Hume, *Treatise*, Bk. I, Pt. I, sect. vii, especially the last paragraph.

conversant about non-entities; nothing remains but to consider geometry as conversant with such lines, angles, and figures, as really exist." [1]

Since nothing, whether real or imaginary, exactly conforms to the definitions, there is, Mill thinks, no escaping the admission that the objects of geometry do not exactly conform to the definitions. But the imaginary object solution is an attempt to escape this admission.

What solution of the problem does this admission leave open? A solution based on the possibility of abstraction. By feigning the objects of geometry "to be divested of all properties, except those which are material to our purpose", we feign the objects of geometry exactly to conform to the definitions.

To anyone who adopts this solution of the problem of the *meaningfulness* of geometrical propositions the further problem of the *truth* of geometrical propositions should present no difficulty. Geometrical propositions are hypothetical. Because nothing exactly conforms to the definitions, the antecedents of these propositions are not true. But just because geometrical propositions are hypothetical this does not matter. Neither the antecedents nor the consequents are *asserted*. Both antecedents and consequents are *entertained*. But the problem of their entertainment is only the problem of meaningfulness.

To Mill, however, the further problem of the *truth* of geometrical propositions *does* present a difficulty. In his anxiety to explain away "the peculiar certainty always ascribed to the sciences which are entirely, or almost entirely, deductive",[2] Mill *makes* the problem of the *truth* of geometrical propositions present a difficulty. He confuses *hypothetical judgment* with *inference*. The confusion has perhaps already appeared in Mill's assumption that geometry "cannot be supposed to be conversant about non-entities". Must we not protest that no hypothetical proposition is *about* anything? A hypothetical proposition may be *true of something*. In other words, its antecedent, and so (if the hypothetical proposition is true) its consequent, may be true. But a hypothetical proposition need not, in order to be true, be *true of anything*.

The confusion appears unmistakably in Mill's footnote on the remark that geometry "is built on hypotheses": [3]

"An hypothesis, in science, usually means a supposition not proved to be true, but surmised to be so, because if true it would account for certain known facts; and the final result of the

[1] Beginning of third paragraph of § 1.
[2] First paragraph of § 1.
[3] Fourth paragraph of § 1. My italics.

speculation may be to prove its truth. The hypotheses spoken of in the text are of a different character; they are known not to be literally true, while as much of them as is true is not hypothetical, but certain. The two cases, however, resemble each other in the circumstance that in both *we reason, not from a truth, but from an assumption, and the truth therefore of the conclusions is conditional, not categorical.*" What would Mill say of the hypothesis of a *reductio ad absurdum?* [1]

The failure of real things exactly to conform to geometrical definitions has been seen to present two problems. How can geometrical propositions be *meaningful?* Mill rejects the solution that geometrical propositions are about imaginary things exactly conforming to the definitions, and adopts the solution that geometrical propositions are about real things feigned exactly to conform to the definitions. How can geometrical propositions be *true?* Instead of giving the obvious answer that geometrical propositions are hypothetical and that the truth of a hypothetical proposition does not require the truth of its antecedent, Mill insists that geometry is infected with the falsity of the hypotheses on which it is "built". But the failure of real things exactly to conform to geometrical definitions presents yet a third problem, a problem which for epistemological empiricism is formidable if not insoluble. How can geometrical propositions be *evident?*

[1] From this confusion Mill perhaps partially extricates himself when he claims: "The axioms . . . differ from that other class of fundamental principles which are involved in the definitions, in this, that they are true without any mixture of hypothesis". Does Mill here recognise that axioms, just because they are hypothetical propositions, are "true without any mixture of hypothesis"? He proceeds: "That things which are equal to the same thing are equal to one another, is as true of the lines and figures in nature, as it would be of the imaginary ones assumed in the definitions". By "the imaginary ones assumed in the definitions", Mill must mean, not the imaginary things which come no nearer than do real things to satisfying the definitions, but the things (neither real nor imaginary) which real things are feigned to be. The proposition, he must be claiming, is as true of things which do not, as it would be of things which did, exactly conform to the definitions. I think the explanation is only this: A definition of 'equal' is not among "the definitions", and "the lines and figures in nature" can, Mill thinks, be exactly "equal to the same thing". Yet the axiom which Mill selects for special study is "the proposition that two straight lines cannot inclose a space". Now Mill does not think *either* that "the lines and figures in nature" are "perfectly straight" *or* that their failure exactly to conform to the definition of 'straight' leaves unaffected the incapacity of any two of them to "inclose a space". How then can Mill claim of axioms in general that they are "true without any mixture of hypothesis"?

Neither Croom Robertson nor Jevons sufficiently distinguishes this problem from the others. Robertson, we saw, attributes to Mill the position " that there is a purely hypothetical element in the definition of geometrical figures, and that it is this, and not anything we can actually see or imagine, that enables us to prove the truths of geometry ". Jevons, we saw, attributes to Mill the position that " if these imaginary straight lines are not perfectly straight, they will not enable us to prove the truths of geometry ".

Mill, however, as an epistemological empiricist, is curiously unconcerned about this problem of evidence, and nowhere notices the problem except in a footnote introduced [1] into the later editions :

" Those who employ this argument to show that geometrical axioms cannot be proved by induction, show themselves unfamiliar with a common and perfectly valid mode of inductive proof ; proof by approximation. Though experience furnishes us with no lines so unimpeachably straight that two of them are incapable of inclosing the smallest space, it presents us with gradations of lines possessing less and less either of breadth or of flexure, of which series the straight line of the definition is the ideal limit. And observation shows that just as much, and as nearly, as the straight lines of experience approximate to having no breadth or flexure, so much and so nearly does the space-inclosing power of any two of them approach to zero. The inference that if they had no breadth or flexure at all, they would inclose no space at all, is a correct inductive inference from these facts, conformable to one of the four Inductive Methods hereinafter characterized, the Method of Concomitant Variations ; of which the mathematical Doctrine of Limits presents the extreme case." I cannot believe that either observation or inference can do the work to which Mill here calls them. And I quote this passage not for its merits but for its relevance. On the one occasion on which Mill notices the problem of evidence which the failure of real things exactly to conform to geometrical definitions presents to the epistemological empiricist, Mill displays no inclination to seek exactly conformable objects among imaginary things.

Thus, neither in solving the problem of *meaningfulness* nor in solving the problem of *truth* nor in solving the problem of *evidence* have we found Mill qualifying his rejection of the view that imaginary things come nearer than do real things to satisfying geometrical definitions. Jevons' failure sufficiently to distin-

[1] At the end of the penultimate paragraph of § 4.

guish the three problems may have helped to prevent him from grasping Mill's solutions. But what convinced Jevons that Mill adopted an imaginary object solution of *any* problem? Sheer confusion of the possibility of abstraction with the possibility of abstract ideas. Sheer incapacity to distinguish the Nominalism of Berkeley and Hume from the Conceptualism of Locke.

Let us look once more at the indictment:

"Mill's ingenuity seldom fails him. Geometry, in his opinion, treats not of things as they are in reality, but as we suppose them to be. Though straight lines do not exist, we can experiment in our minds upon straight lines, as if they did exist. It is a peculiarity of geometrical science, he thinks, thus to allow of *mental experimentation*. Moreover, these mental experiments are just as good as real experiments, because we know that the imaginary lines exactly resemble real ones."

What imaginary lines? Those which Jevons tacitly presupposes to be involved in supposing lines to be other than "as they are in reality". Whether this tacit presupposition is true or false is irrelevant. What is relevant is Mill's plain statement that it is false. This alone is relevant since it is "Mill's ingenuity", "Mill's doctrines", that Jevons is avowedly engaged in expounding. But Mill's plain statement, that "it is an error to suppose, because we resolve to confine our attention to a certain number of the properties of an object, that we therefore conceive, or have an idea of, the object, denuded of its other properties", finds no place in the "somewhat full extracts" to which Jevons restricts us. If, however, Jevons fails to appreciate the relevance of this statement, the only possible explanation is that Jevons can make nothing of the statement.

The truth of this explanation can be confirmed by an examination of the following passage: "In fact, Mill tells us that 'we can reason about a line as if it had no breadth', because we have 'the power, when a perception is present to our senses, or a conception to our intellects, of *attending* to a part only of that perception or conception, instead of the whole'. I believe that this sentence supplies a good instance of a *non sequitur*, being in conflict with the sentence which immediately follows. Mill holds that we learn the properties of lines by experimentation on ideas in the mind; these ideas must surely be conceived, and they cannot be conceived without thickness. Unless, then, the *reasoning* about a line is quite a different process from *experimenting*, I fail to make the sentences hold together at all. If, on the other hand, we can reason about lines without breadth, but can only experiment on thick lines, would it not be much

better to stick to the reasoning process, whatever it may be, and drop the mental experimentation altogether ? " [1]

The sentences which Jevons believes to be " in conflict " are these : '*we can reason about a line as if it had no breadth*' and '*we cannot conceive a line without breadth*'. He declares his inability " to make the sentences hold together " unless on the supposition that " the *reasoning* about a line is quite a different process from *experimenting* ". Clearly, the supposition intended is the absurdity that reasoning about a line does not involve conceiving it. But why does Jevons believe the two sentences to be " in conflict " ? Because he treats the sentence '*we can reason about a line as if it had no breadth*' as only verbally different from the sentence '*we can reason about lines without breadth*'. Jevons' mistaken belief that Mill concedes to *reasoning* what he denies to *conceiving* is, therefore, the product of inability to understand the attempt to reconcile *a capacity to abstract* with *an incapacity to form abstract ideas*.

So much for the probable origin of Jevons' conviction that Mill adopted an imaginary object solution. I turn now to the passage which Jevons offers in evidence. Taken from § 5, this passage consists of the second paragraph, bereft of its first sentence, followed by the third paragraph, bereft of its last sentence. Jevons remarks : " I have been obliged to give this long extract in full, because, unless the reader has it all freshly before him, he will scarcely accept my analysis ".[2] The truth is that the extract is not long enough. Jevons' analysis owes such plausibility as it achieves to his suppression of the context. This was pointed out by Arthur Strachey,[3] who, by supplying the opening sentence of the second paragraph and italicising the opening words of the third paragraph, established the important fact that what Jevons treats as an inconsistent admission is really the formulation of a possible objection to which Mill presently replies. Strachey fairly condemned Jevons' analysis as " a mistake which a moment's glance at the context . . . ought to have prevented ". And he pertinently commented : " No doubt, if the ' essential illogicality ' of Mill's mind can be proved by ascribing to him a statement which he represents as that of an opponent, Prof. Jevons will succeed in his undertaking ".

Right so far, Strachey did not go far enough. The first paragraph of § 5 formulates one objection ; the second para-

[1] *Pure Logic, etc.*, p. 217.
[2] *Ibid.*, p. 210.
[3] MIND, 1878, pp. 283-4.

graph formulates another objection; the third paragraph formulates Mill's reply to the objection formulated in the first; the fourth paragraph formulates Mill's reply to the objection formulated in the second. If, then, we can be persuaded to isolate the second and the third paragraph from the first and the fourth paragraph, we may easily acquiesce in the judgment that "Mill's mind was essentially illogical". Jevons' extract withholds the reply to the objection which it gives and withholds the objection the reply to which it gives. Such is the extract concerning which he says that "unless the reader has it all freshly before him, he will scarcely accept my analysis".[1]

In so far grasping the structure of § 5 there is no difficulty. There is difficulty only in seeing how Jevons could have failed so far to grasp its structure. And this difficulty I cannot overcome, though I should be reluctant to contemplate the implications of an admission that the difficulty is insuperable.

In order so far to grasp the structure of § 5 it is necessary to read what Mill says. Nothing else is necessary. The last two sentences of § 4 are: "The advocates of the *à priori* theory are obliged to have recourse to other arguments. These are reducible to two, which I shall endeavour to state as clearly and as forcibly as possible." The first sentence of the *first* paragraph of § 5 is: "In the first place it is said, that if our assent to the proposition that two straight lines cannot inclose a space, were derived from the senses, we could only be convinced of its truth by actual trial, that is, by seeing or feeling the straight lines; whereas in fact it is seen to be true by merely thinking of them". The first sentence of the *second* paragraph is: "To this argument it might be added in the case of this particular axiom, (for the assertion would not be true of all axioms,) that the evidence of it from actual ocular inspection is not only unnecessary, but unattainable". The first sentence of the *third* paragraph is: "To these arguments, which I trust I cannot be accused of understating, a satisfactory answer will, I conceive, be found, if we advert to one of the characteristic pro-

[1] In his preface to *Pure Logic and other Minor Works* (p. xxiii), Adamson wrote: "Whatever opinion may be formed of the value of the general objections taken to Mill's logical and philosophical doctrines, or of the appropriateness of the limits imposed by the author on his criticism, it must be acknowledged that he took every precaution against oversight or hasty judgment, and that his every utterance was supported by the fullest evidence attainable". In *The Metaphysics of John Stuart Mill* (pp. 124-127), W. L. Courtney swallows Jevons whole, remarking (p. 127, note): "His summing up of Mill's position is clear, and is adequately supported by his references".

perties of geometrical forms—their capacity of being painted in the imagination with a distinctness equal to reality: in other words, the exact resemblance of our ideas of form to the sensations which suggest them". The first sentence of the *fourth* paragraph is: "These considerations also remove the objection arising from the impossibility of ocularly following the lines in their prolongation to infinity".

Never was a passage more amply or more unmistakably charted. Only those who disregard Mill's plain directions can lose their way. And it is because Jevons disregards these directions that he offers in evidence the extract which he quotes. We must concede to Jevons that in this extract Mill maintains both the possibility and the relevance of geometrical experimentation upon "imaginary lines". If, then, Mill is not here qualifying his rejection of the doctrine that imaginary things come nearer than do real things to satisfying geometrical definitions, what, in Mill's opinion, is the purpose of experimentation upon "imaginary lines"? I conjecture that Mill thinks its main purpose a very humble one. The geometer may find himself without chalk or pencil. But Mill does not here tell us. And anyone who supposes that Mill is here *advocating* experimentation upon "imaginary lines" will construe Mill's silence about the purpose of such experimentation as an omission. What I hope to show, however, is that Mill, although he maintains the possibility and the relevance of such experimentation, does not, in Jevons' extract, advocate such experimentation. His silence is, therefore, an omission only of the irrelevant. He is under no obligation to represent experimentation upon "imaginary lines" as serving any special purpose.

Mill sets himself the task of replying to the objection "that if our assent to the proposition that two straight lines cannot inclose a space, were derived from the senses", as Mill has in § 4 contended that it is, then "we could only be convinced of its truth by actual trial, that is, by seeing or feeling the straight lines; whereas in fact it is seen to be true by merely thinking of them". The objection is variously formulated, and among the various formulæ is this: "if we see a property of straight lines to be true by merely fancying ourselves to be looking at them, the ground of our belief cannot be the senses, or experience; it must be something mental". Concerning this formula Carveth Read, in his critical notice of *Pure Logic and other Minor Works*, says: "Oddly enough Mr. Strachey himself, in correcting Jevons, makes a precisely similar error. He says of Mill: 'His theory being that we see a property of straight lines to be

true by merely fancying ourselves to be looking at them, etc.'. But this Mill gives as an opponent's view." [1] The proposition, that " we see a property of straight lines to be true by merely fancying ourselves to be looking at them ", is indeed very wrongly described by Strachey [2] as Mill's theory. But it is also inadequately described by Carveth Read as " an opponent's view ". For Mill does not challenge it. He treats it as an obvious fact. What he does challenge is only the claim that it conflicts with his theory.

Admitting rather than claiming that we may " see a property of straight lines to be true by merely fancying ourselves to be looking at them ", admitting rather than claiming " the possibility of satisfying ourselves that two straight lines cannot inclose a space, by merely thinking of straight lines without actually looking at them ", Mill undertakes to reconcile this admission with his theory. Formulated in general terms, the admission is that a geometrical axiom can be established without experimentation upon " real lines ". The reconciliation can, Mill thinks, be effected by a defence of the position that a geometrical axiom can be established by experimentation upon " imaginary lines ". This position requires the possibility and the relevance of such experimentation. But it does not require such experimentation to have any advantage over experimentation upon " real lines ".

What Mill here contrasts under the unhappily chosen adjectives " *imaginary* " [3] and " *real* " are what Hume contrasts under the names " *idea* " and " *impression* " and what recent philosophers contrast under the names " *image* " and " *sensum* ". The distinction is, not between *realities and unrealities*, but between *realities of different kinds*. Mill holds that the part played by *sensa*, when, looking at straight lines, we think of them, is played by *images*, when, without looking at straight lines, we think of them. And he holds that the part played, whether by *sensum* or by *image*, is not that of a mere aid to attention but that of an object of attention. Geometrical axioms are, Mill thinks, established by observing the properties of sensa or of images and generalising what observation ascertains.

[1] MIND, 1891, p. 108, note. [2] *Ibid.*, 1878, p. 283.

[3] Mill's choice of the expression " object existing only in our fancy " is not less unhappy. But Mill also uses the expressions " mental image " and " idea ". In Book I, chap. iii, § 3, Mill says : " Even imaginary objects (which are said to exist only in our ideas) are to be distinguished from our ideas of them ". And in chap. ii, § 3, he says : " All names are names of something, real or imaginary ". In these passages his distinction *is* between realities and unrealities.

Geometrical experimentation upon images is, Mill thinks, possible because of "one of the characteristic properties of geometrical forms—their capacity of being painted in the imagination with a distinctness equal to reality". And he thinks it relevant "inasmuch as pictures, if sufficiently accurate, exhibit of course all the properties which would be manifested by the realities at one given instant, and on simple inspection: and in geometry we are concerned only with such properties, and not with that which pictures could not exhibit, the mutual action of bodies one upon another". It is because images could not exhibit the mutual action of bodies one upon another that *physical* experimentation upon images is irrelevant. "That a stone thrown into water goes to the bottom, may be perceived by our senses, but mere thinking of a stone thrown into the water would never have led us to that conclusion."

It is easy to see how, by maintaining the possibility and the relevance of geometrical experimentation upon images, Mill hopes to *explain* "the possibility of satisfying ourselves that two straight lines cannot inclose a space, by merely thinking of straight lines without actually looking at them". But how does Mill hope by this explanation to *reconcile* his admission with his theory? He contends "that we do not believe this truth on the ground of the imaginary intuition simply, but because we know that the imaginary lines exactly resemble real ones and that we may conclude from them to real ones with quite as much certainty as we could conclude from one real line to another". But this path leads nowhere. Mill finds himself compelled to admit that "we should not be authorized to substitute observation of the image in our mind, for observation of the reality, if we had not learnt by long-continued experience that the properties of the reality are faithfully represented in the image". Now from what kind of experience could we have learnt this? Obviously not from experience merely of sensa. In supporting the comparison of images with sensa, observation of images would be no less indispensable and no less ultimate than observation of sensa. Thus, while Mill can delay, he cannot escape, the admission of images among the *ultimate* data. Mill would perhaps have been wiser to admit them boldly and to qualify his theory accordingly. Geometrical axioms, he could still insist, are "experimental truths; generalizations from observation". But alongside "the evidence of our senses" must be recognised the evidence of our imaginations, both sense and imagination being faculties by which ultimate data may be experienced.

Whatever may be thought of Mill's attempt to reconcile his admission with his theory, there is no justification for thinking that Mill either *does* repent or *should* repent of his declaration that " neither in nature, nor in the human mind, do there exist any objects exactly corresponding to the definitions of geometry ". He maintains the possibility and the relevance of geometrical experimentation upon images, because he thinks that such experimentation is involved in " satisfying ourselves that two straight lines cannot inclose a space, by merely thinking of straight lines without actually looking at them ". He is no more advocating such experimentation than he is advocating " merely thinking of straight lines without actually looking at them ". The straight lines of which we " merely think " need, therefore, be no straighter than the straight lines at which we " actually look ". Images need come no nearer than sensa to satisfying geometrical definitions. It suffices that they come as near.

There is some confusion, however, in the passage in which Mill expresses his recognition that this suffices : The capacity of geometrical forms " of being painted in the imagination with a distinctness equal to reality . . . enables us to make . . . mental pictures of all possible combinations of lines and angles, which resemble the realities quite as well as any which we could make on paper ; and . . . makes [1] those pictures just as fit subjects of geometrical experimentation as the realities themselves ; inasmuch as pictures, if sufficiently accurate, exhibit of course all the properties which would be manifested by the realities at one given instant, and on simple inspection ". Jevons characteristically comments : " Such pictures, Mill admits, must be *sufficiently accurate ;* but what, in geometry, is sufficient accuracy ? The expression is, to my mind, a new and puzzling one ".[2] It is hard to believe that even to the mind of Jevons the expression " sufficiently accurate " could be either new or puzzling. But Mill's use of the expression here does present some difficulty.

The " mental pictures ", Mill says, " resemble the realities quite as well as any which we could make on paper ". But " any which we could make on paper " would *be* " the realities ". They would be lines at which we could " actually look ". And their fitness as " subjects of geometrical experimentation " would depend on the degree, not of their resemblance to any

[1] In the later editions " makes " has been carelessly changed into " make ".

[2] *Pure Logic, etc.*, p. 210.

realities, but of their conformity to the definitions. Sufficient accuracy, whether of images or of sensa, would be sufficient approximation to the definitions to enable us to infer what complete satisfaction of the definitions would involve. The inadequacy of Mill's treatment of the nature of such inference has already been noted. But of any inclination to evade the need for such inference by recourse to the doctrine, that images come nearer than sensa to satisfying the definitions, there is no trace.

So far Mill has neither told us nor incurred an obligation to tell us of any purpose subserved by geometrical experimentation upon " imaginary lines ". For so far Mill has not advocated such experimentation. But, having, in reply to one objection, maintained the possibility and the relevance of such experimentation, Mill, in reply to another objection, advocates such experimentation. And it is here that he for the first and last time finds a special purpose for such experimentation.

This purpose is very different from the purpose with which Jevons is obsessed. It is made clear even in Mill's formulation of the objection to which he is replying: Of the axiom " that two straight lines cannot inclose a space " the evidence " from actual ocular inspection is not only unnecessary, but unattainable ". And the purpose is again made clear in Mill's reply: " These considerations also remove the objection arising from the impossibility of ocularly following the lines in their prolongation to infinity. For though, in order actually to see that two given lines never meet, it would be necessary to follow them to infinity; yet without doing so we may know that if they ever do meet, or if, after diverging from one another, they begin again to approach, this must take place not at an infinite, but at a finite distance. Supposing, therefore, such to be the case, we can transport ourselves thither in imagination, and can frame a mental image of the appearance which one or both of the lines must present at that point, which we may rely on as being precisely similar to the reality."

The futility of this reply is painfully evident. Why may we rely on the image " as being precisely similar to the reality " ? Granted that the image must be precisely similar to some possible sensum, why may we rely on it as being precisely similar to the sensum which we should experience if we could " ocularly follow " the lines to that point ? We might as well draw a picture on paper of the appearance which the lines must present. And we might as well take the portions of the lines which we can " ocularly follow " as a fair sample of the portions which lie beyond. The

procedure prescribed clearly presupposes the knowledge which it is intended to acquire.

While Mill has no justification for claiming that we may rely on the image as being precisely similar to the unattainable relevant sensum, Jevons has no justification for supposing Mill to claim that the image comes any nearer than would the unattainable sensum to satisfying the relevant definition. Why need we "transport ourselves thither in imagination"? Only because we can transport ourselves in no other way. Not because, if we could "ocularly follow" the lines so far, the sensum which we should then experience would be in any way inferior to the image on which Mill thinks we must, only because the sensum is unattainable, rely.

In support of his general thesis that "Mill's mind was essentially illogical", Jevons builds his special case against "Mill's doctrines concerning geometrical reasoning" on his ascription to Mill of the doctrine, that the possibility of geometry is saved by imaginary lines exactly conforming to geometrical definitions. I have tried to show that Jevons ascribed this doctrine to Mill only because his own mind was essentially uncritical. Mill explicitly rejects the doctrine. And he nowhere, whether explicitly or implicitly, accepts it. There are three ways in which the possibility of geometry may seem to be endangered by the failure of real lines exactly to conform to geometrical definitions. How can geometrical propositions be *meaningful?* How can they be *true?* How can they be *evident?* Mill's answers to these questions nowhere imply that imaginary lines exactly conform to geometrical definitions. What, then, is the explanation of Jevons' mistake? It originates in a complete misunderstanding of the very passage in which Mill explicitly rejects the doctrine ascribed to him. With his rejection of the doctrine, that the objects of geometry are imaginary things exactly conforming to the definitions, Mill couples an acceptance of the doctrine, that the objects of geometry are real things feigned exactly to conform to the definitions. Jevons, treating the sentence '*we can reason about a line as if it had no breadth*' as only verbally different from the sentence '*we can reason about lines without breadth*', is unable to distinguish what Mill affirms from what Mill denies. But what does Jevons offer in evidence? A passage whose structure he grossly misrepresents. Mill maintains the possibility and the relevance of geometrical experimentation upon what he unhappily calls "*imaginary lines*" and under this description unhappily contrasts with "*real lines*". The distinction intended is that

between *images* and *sensa*. Mill is replying to objections. To the objection that it is possible to establish a geometrical axiom without experimentation upon *sensa*, he replies that this is made possible only by experimentation upon *images*. So far he is not *advocating* experimentation upon images. To the objection that the relevant sensa may be unattainable Mill does indeed reply by advocating experimentation upon images. But he advocates such experimentation only because he thinks that the relevant sensa are unattainable and not because he thinks that the images come any nearer than would the unattainable sensa to satisfying geometrical definitions.

NOTE.

In Mill's chapter, "Of the Import of Propositions", Jevons thinks he finds a (p. 214) "denunciation of the handling of ideas" which is "in distinct conflict with Mill's subsequent advocacy of mental experimentation".[1] From Book I, chap. i, § 1, Jevons quotes: "The notion that what is of primary importance to the logician in a proposition, is the relation between the two *ideas* corresponding to the subject and predicate (instead of the relation between the two *phenomena* which they respectively express), seems to me one of the most fatal errors ever introduced into the philosophy of Logic, and the principal cause why the theory of the science has made such inconsiderable progress during the last two centuries. The treatises on Logic, and on the branches of Mental Philosophy connected with Logic, which have been produced since the intrusion of this cardinal error, though sometimes written by men of extraordinary abilities and attainments, almost always tacitly imply a theory that the investigation of truth consists in contemplating and handling our ideas, or conceptions of things, instead of the things themselves: a doctrine tantamount to the assertion, that the only mode of acquiring knowledge of nature is to study it at second hand, as represented in our own minds." Having thus quoted Mill, Jevons says (p. 214), "Mill here denounces the *cardinal error* of investigating nature at second hand, as represented in our own minds". But what Mill represents as an error is, not the investigation of nature at second hand, but (and even this is represented, not as the cardinal error, but as an erroneous implicate thereof) the assertion that this is "the only mode of acquiring knowledge of nature". So far from denying, Mill

[1] Again Courtney follows Jevons, *The Metaphysics of John Stuart Mill*, p. 125.

thereby suggests, that to study nature at second hand is among the modes of acquiring knowledge of nature. Jevons adds (p. 214) that " Mill's denunciation of the handling of ideas is not limited by any exceptions ; it is applied in the most general way, and arises upon the general question of the Import of Propositions ". Yet the sentence immediately preceding the passage quoted by Jevons runs : " When I mean to assert anything respecting the ideas, I give them their proper name, I call them ideas : as when I say, that a child's idea of a battle is unlike the reality, or that the ideas entertained of the Deity have had a great effect on the characters of mankind ". Mill's position is (Book II, chap. vi, § 1) " that, though propositions may be made both respecting names and respecting ideas, neither the one nor the other are the subject-matter of Propositions considered generally ". Clearly, then, Mill's answer to " the general question of the Import of Propositions " does not queer the pitch for " mental experimentation ". Moreover, in place of the last clause of the passage quoted by Jevons, Mill had in the first two editions written : " a process by which, I will venture to affirm, not a single truth ever was arrived at, except truths of psychology, a science of which Ideas or Conceptions are avowedly (along with other mental phenomena) the subject-matter ". Here an exception in favour of the value of some mental experimentation is explicitly admitted. Of the suppression of this clause Jevons says (p. 215, note 2) : " The striking out of these words seems to indicate that he had perceived the absolute conflict of his two doctrines ; yet he maintains his opinion about *the cardinal error* of handling ideas, and merely deletes a too glaring inconsistency which results from it ". The probable explanation is that Mill became aware that further exceptions in favour of the value of mental experimentation would have to be admitted. Either because he felt diffident about the complete list, or because he felt unwilling to complicate what was already a digression, Mill preferred to withdraw his delimitation of the value of the investigation of nature at second hand and to content himself with a denial that this is " the only mode of acquiring knowledge of nature ".

III.—"SUBJECTIVE" AND "OBJECTIVE" IN MORALS.

By J. Laird.

It is generally allowed that "objective" and "subjective" are often among the more elusive terms in a philosopher's vocabulary, and that they tend to be quite as slippery in ethical as in other philosophical discussions. I shall not try to examine all the senses in which the terms have been or could be used, but I shall consider some of them with special reference to ethical notes and queries.

(*a*) Quite frequently it is stated, and even more frequently it is assumed, that "objective" means pertaining to the physical world and that "subjective" means pertaining to minds, persons or "subjects". Here the underlying idea appears to be that the universe consists of bodies and minds, that minds are not bodies, that bodies are not minds, and that nothing is both a body and a mind. Hence whatever is trans-subjective must be physical, an "object" and not a subject.

This underlying idea may well be most highly questionable, but we need not linger over it. If it described the only significant contrast in the case, ethics could not be "objective" in any really important way. True, our deeds have a physical side—dropping a bomb or poisoning someone's soup. It is probable, at the least, that even our most secret thoughts, all growth in character and all stirrings of the heart have a behaviouristic expression. Nevertheless, neither action nor character is moral at all unless there is something mental in it. That is obvious if an action is willed or intended, if we are responsible for it in that sense. If the action or if the quality of character is more subterranean, if it is unselfconscious, unperpended, "sub" or "un"-conscious in one of the better meanings of these perplexing terms, the matter may be rather more obscure; but there could be no morality in anything that was utterly witless and incorrigibly insentient. If there be any trans-subjectivity in ethics it must be a trans-subjectivity that subjects personally acknowledge.

(*b*) It seems plain that " subjects ", persons or minds claim trans-subjectivity in respect of certain of their employments. An obvious instance is what we call " truth ", for it is usual to say that truth is " objective " and indeed that the adverb " objectively " in the phrase " objectively true " is pleonastic.

When I say that this instance is " obvious " I may be invited to explain myself ; for some would counter my statement by saying that truths like the familiar " $2 + 2 = 4$ " are independent of each and every subject, were true before the world began (if it did begin), are discovered by minds but are " there " to discover whether there be any minds or no. They are " objective ", I may be told, in the full sense of owing nothing to any mind for their nature or existence, not merely in the sense (if there is one) in which a subject may somehow have trans-subjective activities.

I would not myself say these things (or would not say them now, though I may once have said them). It appears to me now that truth is a property of beliefs, assertions and the like, that is to say of the mental processes of some subject. Therefore, if there were no subjects there could be no truths. No doubt we may say that the truth of Boyle's law was Boyle's discovery not Boyle's product, and that the law expresses something that did not have to wait for Boyle but existed for aeons before him. Nevertheless, it seems to me that to speak of " truths " as if they could be out of relation to all possible subjects is a hurried way of saying that *if* anyone thought of them he would be thinking truly. Truth has trans-subjective validity but it is not wholly subjectless on that account.

In any case, even if these statements were much more dubious than I take them to be, our discussion may still proceed in safety. For there is at least one perfectly good sense of " truth " in which beliefs and assertions may be true ; and beliefs and assertions are not subjectless.

Indeed, one of the relevant questions in this discussion is, quite simply, whether moral beliefs and assertions can be true. Here the most important predicates are " good " and " right " (where " good " must be understood to mean " morally good " and " right " must be understood to mean " morally right "). Can the statements " This is good ", " this is right " be true at all ? *If* they are true, (we are told) nothing would be added (though something might be explained) by saying that they were " objectively " so.

This question, in its turn, must be understood to imply that the words " good " and " right " are taken, as we say, literally,

that is to say that their meaning is not metamorphosed in some translation of them, along with the explanation that, metamorphosed, they might be true.

Prima facie when we say, as we often do, that mercy is good and gracious, we make the same truth-claim as when we say that young peas are green. Many, however, would object that the claim is hollow. To say that "X is good", they tell us, is just to say that X is liked or applauded—the sort of analysis that most people, perhaps, would give to an adjective like "gracious". These objectors would probably go on to explain that intricate questions arise regarding who it is that likes or applauds, whether, in the case of moral approving, a peculiar superfine brand of liking or applause is contemplated, and so forth. Here, however, I shall omit these important niceties. The upshot of the objection would be that "good" is not properly speaking a characteristic of mercy although greenness is, properly speaking, a characteristic of young peas. No doubt it would be difficult to maintain quite generally that nothing can be true unless it assigns a characteristic. "Good", however, *prima facie* does so. According to the objectors it professes to tell us but cannot really tell us what something is. Therefore it is incapable of truth unless it is wholly transformed, transformed for instance into the statement that X is applauded.

Similar arguments might be employed concerning "right", on the understanding that "right" is not only distinct in meaning from "good" but also that it cannot be derived from "good". This would be said, for example, by those utilitarians who, like Mill, objected to Whewell on the ground that "right" for the intuitionists was only the ejaculation of a mysterious instinct or "moral sense". In brief, it was what we might now call only a hunch, submissible to no standards of validity at all, just a something that we felt in our bones.

I do not intend to argue these points here. I am only saying that if statements could be true in which "good" or "right" occur (in the moral significance of these terms), these statements would be trans-subjectively and indeed objectively true in one legitimate sense of "objective". If that were impossible ethics would not have *this* particular claim to objectivity although, for all we have so far shown to the contrary, it might have other and perhaps better claims.

(*c*) It is sometimes said that men do not, properly speaking, make any truth-claim unless they profess to *know*, that is, to know-for-certain. To say "I believe that such and such is the case" admits the existence of a trans-subjective standard but

does not claim that the standard has been reached. The point may not seriously affect the analysis of objectivity. Precisely the same trans-subjectivity may exist whether we know it for certain or don't. On the other hand its importance to mankind and, in particular, to moralising mankind might be very great. An acknowledged but hidden standard may be thought unpractical. A standard acknowledged and known-for-certain is obviously a serious affair.

Knowing-for-certain, if it exists, does not mean simply " complete personal assurance ". Men have often had complete personal assurance of what was false, and nothing that is false can be known-for-certain. There may be and there frequently is complete personal assurance simply because no occasion for questioning an assumption has arisen. That is not knowing-for-certain. The required certainty, we might even say, is " objective " and not " subjective ". Indeed, I think a man might have it without having full subjective assurance; for he might know-for-certain and yet doubt, that is, might suspend conviction. A good deal of Cartesian doubt seems to have been of that order. We may sometimes wonder whether we do remember what we remember very clearly, and similarly, I should say, may bemuse ourselves with fantastic doubts about our own morals or those of other people when (to use ordinary language) we " know perfectly well " that the doubts *are* fantastic.

For myself, I am not at all happy about the existence of this alleged knowing-for-certain. Many philosophers, however, assert its existence and believe they can prove its existence. They may be right, and if they are right they need not (I suppose) be intimidated by the fallibilists. Infallibility is a term that applies to a general faculty, and they need not lay claim to such a general faculty. All they have to say is that *when* a man knows anything for certain there can, from the nature of the case, be no error *there*.

Let it be conceded, then, that it may be highly pertinent to our inquiry to ask what in ethics can be known-for-certain. If so, " good " and " right " being the principal matter, the knowing-for-certain would have two principal varieties. A man would claim to know-for-certain that if such and such facts occurred (certain experiences, say) they would be good, or, again, that if such and such facts occurred (certain deeds, say) they would be right. Further, it would be pleasant if the man had wholly certain knowledge of something more than these hypothetical statements and knew for certain that such and such an experience *was* good, and that such and such a deed *was* right.

In short, both the nature and the goodness or rightness of the facts would have to be known-for-certain.

If the goodness of certain facts (knowledge of their nature being assumed) were held to be known-for-certain, it would have to be admitted that men differ very much in such judgments. It would not be true, however, that all who have pondered such facts claim to know the goodness of the facts for certain, and if divergences remained among those who did claim that they had wholly certain knowledge, the only inevitable conclusion would be that some of these people were false claimants. Besides, there would probably be little effective denial of the statements, say, that there is something good in pity and in mercy, and that there is much good in love and in peace of soul. Add to this reflection the further reflection that apparent agreement concerning the nature of the fact may conceal real divergence, at any rate if the fact is not over-simplified (as probably it is in the above terse, abstract statements) and is intended fully to describe the actual condition of some actual man in some actual situation. Yet a further relevant consideration would be whether, when we say that such and such a " fact " is or would be good, we should have to decide whether we mean " good on the whole ", " wholly good ", " good in important respects " and the like. Some of these considerations might diminish the amount of disagreement, leaving, perhaps, a rather small residue. But, as I have said, the existence of disagreement, even if it is not small, is not a fatal objection to this doctrine.

Similar remarks might be made about " right ", although there seems to me to be rather more disagreement about " right " than about " good ". (But I wouldn't press the point.)

Supposing, however, that we could and did have much certain knowledge about the sort of fact that would be good or would be right if it occurred, it seems clear that there is at least one very important respect in which the alleged certain knowledge of fact could not be claimed. The sort of moral knowledge that most men would like to have, and that many (if not most) believe that they have, concerns the future. They want to know what is good or right for them to do here and now, *i.e.*, what future event they ought to aim at in the present. The future, however, can never be known for certain. Consequently, since knowing-for-certain in moral matters requires both the certain knowledge of the nature of the fact and the certain knowledge of its goodness (or rightness as the case may be) there will be one type of case, and it by far the most important in vulgar ethics, in which this double requirement could not conceivably be met. That is the

case in which the future comes in. Knowing-for-certain in moral matters, consequently, would have to be either hypothetical or retrospective, and even the retrospection would be subject to a significant qualification. There could be retrospective and certain moral knowledge only if the incident were closed in all relevant moral respects, that is to say if events still to come could not affect the rightness or wrongness of the incident, or, alternatively, the goodness or badness that properly pertained to it.

(*d*) It is sometimes said that there is an oversight in the statement that truth is necessarily objective. For " either-or " statements are true and nothing can exist in an " either-or " fashion. This would hold of knowing-for-certain. If there is knowing-for-certain, an adequate instance of it would be found, say, in our certain knowledge that Socrates either had a niece or hadn't. But the real Socrates could not have possessed " either-or " avuncularity.

There may be ways of evading this puzzle. I shall use it to introduce a matter of great importance for ethics, namely, the status of probability-judgments in that study.

Probability in its full range is much too big a subject for this essay and, in many of its more complex developments, is much too technical for many philosophers, including myself. I shall here refer to the contrast between two very well-known types of probability-theory. In one of them it is held that so-called probability-statements are in fact statements of class-frequency, that is, statements about the steady proportions in large aggregates despite individual irregularity. The other is derived from either-or statements. It declares for instance that the chances are against a fall of two successive heads when a penny is tossed, since the possibilities are " *Either* heads-followed-by-heads, *or* heads-followed-by-tails, *or* tails-followed-by-heads *or* tails-followed by-tails ". If there is no reason for preferring one possibility to another the first possiblity is but one out of four and is therefore relatively unlikely to occur. The odds are three to one against it.

If the class-frequency theory of probability were true (and it is often described as the " objective " view of probability) it would follow that no probability-judgment can hold of the individual case. The only valid judgments of this kind refer to huge aggregates. Hence if probability enters at any point into an ethical judgment, that judgment, if legitimate, must refer only to aggregates. We should not be entitled to say, for instance, " I ought to do this because, if I do it, I shall probably do good ", or (which is a different ethical theory) " If I do this I shall probably do what is good ". The only legitimate state-

ments would be "I ought to do this because it belongs to a class which is generally, though not always, good", or, according to the other view, "If I do this I shall do something that is usually, although not always, good". Similar arguments would hold of "right". According to this theory of probability we should be expressly forbidden to draw the inference that nearly everybody would draw, namely, that just because such and such an action belongs to a class that is usually right or good, therefore there is, so far, a genuine moral reason for doing it in the particular case.

As we have seen, one of the most insistent demands that moral agents make is that they should have some rational guidance concerning what they should do here and now, that is, concerning the duty of some particular agent in some particular case. We should have to revise not the statement only but also the substance of vulgar ethics if ethical judgments properly applied to aggregates of actions only and did not apply at all to individual actions. I cannot think that such a revision of vulgar ethics would be either necessary or desirable. In so far as probability enters into ethics we require a probability that applies to the particular case.

Plainly, probability does enter. For the future is always uncertain, with the consequence that probability has to be our guide with regard to all that is future; and all our moral actions are future-regarding. Even if the goodness or the rightness of the future alternatives *a* or *b* were severally not a matter of probability (and although we may hesitate to claim certainty we do not commonly use the language of probability when we say that *a* or *b* would be good or would be right if they occurred), probability must enter regarding the question of fact if the fact be future. Thus utilitarians hold that we ought to guide present action by probable future consequences and therefore hold, according to one of their views, that it is our duty to do what will probably have the best consequences, or, according to another view, that since the right thing to do is that which *de facto* has the best consequences, we shall probably do the right thing if we do what will probably have the best consequences. Opponents of utilitarianism strongly deny the sufficiency of utilitarian ethics, but they do not deny that what we are aiming at (which includes consequences) in any action defines, in part, what the action is. So they cannot disown the relevance of the point. A fuller discussion of its relevance, therefore, may here be omitted.

So we have to conclude that ethics passes judgment on individual actions, and that these, in so far as they have a future

aim, have to be guided by probabilities and not by certainties. It is consequently an important question for ethical theory whether probability judgments regarding the individual case are "subjective" or "objective".

I submit that such judgments have at any rate trans-subjective validity. If anyone denied this he would have to say, for instance, that a sea-captain who reduced speed during a fog would be acting without reason in a way that had no valid logical defence. That seems to me to be preposterous. Similarly, he would have to say that a man cannot make mistakes about the probability of the individual case, that, for instance, there is no logical difference between the conduct of a man who takes cover under fire, and the conduct of a man who is quite reckless because some palmist has told him he will never be hit. That again seems to me to be preposterous.

The main reason, I think, why "subjectivity" is sometimes ascribed in such cases is that the important instances in which we rely upon probability-judgments in the particular case are the instances in which someone collects *all* the relevant evidence that he can collect and on that basis comes to a conclusion concerning what is likely. In this way one man may easily have more relevant evidence than another. Thus what is more likely than not to one man, on *his* total evidence, may be less likely than not to another man on *his* total evidence. (In the extreme case, and if we are not too metaphysical about certainty, one man may bet on a certainty when another, who has less information, may be making a genuine bet.) This kind of thing, however, is quite irrelevant to the question of the presence or absence of trans-subjective validity. Probability is relative to evidence. Suppose that Jones has pieces of evidence *a* and *b* which together show that an event E is likely, and that Smith has only the evidence *a* in terms of which alone E would be decidedly unlikely. Then *both* should admit that relative to *a* alone the event would be unlikely. In other words the validity of the inference to probability relative to such and such a piece of evidence is not in the least affected by the question what subject has the evidence or how much of the relevant evidence any given subject happens to have.

When it is said, as some people say, that probability is an attempt to extract knowledge out of ignorance (ignorance being plainly subjective) the answer is that no such attempt need be made. What is done is to describe the ratio between so much given but incomplete evidence and the residue that would be necessary were the evidence to be complete. That is governed

by trans-subjective standards in the same way as any other inference that has logical validity. If it be convenient to distinguish between "objective" and merely "trans-subjective" validity, let it be convenient. The major question is whether probability-judgments in the individual case are or are not trans-subjective although made by subjects. I have tried to maintain that they are trans-subjective.

(*e*) It seems sometimes to be held that the subjective is that which varies from subject to subject and that the objective either is or is a species of what does not so vary but is the same for all. This simple distinction, we may be told, suffices, and there is no need to make a pother about any other distinction. For example, the matters we have hitherto considered may be dealt with very shortly. Convictions, opinions and beliefs vary from man to man and so are subjective. For the same reason, error is subjective. What is true and what is known for certain, on the other hand, could not so vary and therefore are objective.

It seems to me that this view is mistaken.

In the first place a mere variation between man and man does not imply subjectivity. There may be evidence that very few people have, but the conclusions of these few are not on that account subjective. Similarly, as often happens where experts are concerned, only a few may have the training or the ability to deal with certain matters. From this, subjectivity in such instances cannot be inferred.

In the second place, and more importantly, it might quite well happen that there was general agreement about what was false, an error in a public opinion that really was public and indeed universal. An agreed opinion would not become objective simply because the opinion was universally held.

Whatever beliefs or assertions are true must be true for all who make them. Whatever is known for certain must be the same for all who know it for certain. That is a consequence of its trans-subjectivity. The mere fact of universality, however, may occur without trans-subjectivity. So the two are not the same.

Thus (I submit) it is false to affirm that trans-subjectivity in the relevant sense can be secured by inter-subjectivity or by what is communal, and *a fortiori* it is false to claim that the opinion of the majority, or the like, necessarily makes any approach at all to objectivity. There is not even a quasi-objectivity of this kind. It is all "quasi".

The relevant trans-subjectivity is independent of all thinkers, not merely of this thinker or of that. It is a standard to which

allegiance is due on the part of all subjects and " independent " of all as well as of each in the appropriate sense of " independent ". (As we saw, processes of knowledge and of belief are not " independent " of subjects in the sense that they could occur if there were no subjects.)

In terms of the same principle we should infer that the subjective, *pur sang*, is that which is wholly dependent upon this or the other particular subject. That, I think, is what we do mean by the term. The subjective is the immitigably private, that which is ultimately an affair of the subject's private being, that in which, if it is a matter of evidence, the private person must, from the nature of the case, have the last word. He may mis-describe or mis-report the affair. The point is that he alone can have the clue. I believe that is what we do hold about the subjective. It is in this sense that we call feeling wholly subjective. It would make no difference if the feelings were universal, *e.g.*, if all men were so constituted that they felt pain when they were burnt—I omit cases of anæsthesia and of ecstatic martyrdom and fire-walking for simplicity's sake. The determining circumstance would be that the evidence for such a statement must lie in each man's private feeling, and that nobody else can do his feeling for him.

It is sometimes said that there is subjectivity where " thinking makes it so ". In the case of " thinking " the contention seems to be misleading. The term " thinking " is only applied with accuracy to mental processes for which there is a trans-subjective standard. Therefore, there is nothing that is made what it is by thinking it so. On the other hand, there are mental events, such as feelings, where the *mentality* makes it so. That, indeed, was the sort of question that we discussed at an earlier stage of this paper when we asked whether " good " was a roundabout way of describing a feeling of satisfaction and whether right was just something that " one felt in one's bones ". Some philosophers claim, it is true, that our emotions and other feelings may be capable of trans-subjective validity. If that were possible many " subjective " theories of good and of right would turn out *not* to be subjective ; but most philosophers regard feeling and emotion as basically and altogether subjective.

(*f*) The terms " subjectively right " and " objectively right " are sometimes used although not very commonly. In particular they were used by Sidgwick (*The Methods of Ethics*, 7th ed., pp. 207 *seqq.*), who even professed (*op. cit.*, p. 344 n.) to have " established " the distinction so described.

One of the meanings that might be given to the phrase " sub-

jectively right" would be "right for some subjects but not for others". On the most objective theory of morals, however, there is nothing to forbid many actions from being objectively right for me but not for you. The right thing for A to do if he is young and fit and a male may be to join the Navy. It does not follow that B, who is an old woman, has any such rightful obligation. Agents differ in their capacities, situation and opportunities. If these differences are relevant to the rightness of the agent's action there will be a difference in the conduct that is right. Such differences in the appropriate conduct are trans-subjective. Anyone, including the agents themselves, ought to admit that the differences were relevant and relevantly affected the conduct that was right. It is not a question of mere opinion or of some immitigable privacy in the being of the agent. In the same way if the differences between individuals are not relevant to some given moral issue the same conduct in that case, by the same logic, will be right for all. The difference between being a man and being a woman is very relevant to the question whether it is a duty to join the Home Guard. It is not in general relevant to the duty of veracity.

The main point that Sidgwick discussed was not the above, but another which, as he said himself (p. 207), was "rather subtle and perplexing". It concerned the relation between an agent's belief in the rightness of some action and the actual rightness of the action. What is the right thing for an agent to do if he falsely believes that such and such an action is right, or if he falsely believes that it is wrong? About this Sidgwick said: "at least it would, I conceive, be universally held that no act can be absolutely right, whatever its external aspect and relations, which is believed by the agent to be wrong. Such an act we may call 'subjectively' wrong, even though 'objectively' right". Discussing the question whether we ought to "tempt" a man to do what we believe to be right against the man's own convictions, Sidgwick went on to say: "I think that the moral sense of mankind would pronounce against such temptation—thus regarding the Subjective rightness of an action as more important than the Objective—unless the evil of an act prompted by a mistaken sense of duty appeared to be very grave".

If the word "tempt" in this statement means to use illicit methods of persuasion, the morality of the exception in grave cases of evil may be rather worse than subtle and rather more than merely perplexing. So I think we should dismiss this particular exception. Indeed I think the general view would be that if grave evil be apprehended we should have a particularly

manifest duty to restrain or punish the man, despite our respect for the sincerity of his behaviour. And it would be consistent to hold that we had a similar duty even if the evil apprehended were not so very grave. It would be enough if it were genuine.

As it seems to me, the common moral sense of mankind would be disposed to make some other reservations to Sidgwick's very definite acceptance of " subjective rightness ". One such reservation would be that any belief or opinion about rightness of action that falls short of the *best* of the agent's belief would not usually be held to deserve nearly so much approbation. I shall call this the agent's sincere belief. Again, I think reservations might have to be made concerning the matter-of-fact part of the agent's sincere moral convictions. If he is, to all intents, a moral madman there would, properly speaking, be no right or wrong in his case. He would just be an irresponsible agent. Similarly, if his strong moral convictions were based largely upon an obvious misapprehension of plain fact, say upon medical ignorance of the normal effects of inoculation, it would be difficult to have greater respect for that sort of " subjective " rightness than for a child's. Both these reservations might be difficult to apply in detail, but unless we made them we should not, I think, be describing the attitude of the " moral sense of mankind ".

Another point should also be mentioned. Sidgwick's contrast between " objective " and " subjective " rightness occurs only where the agent has an actual belief—I should prefer to say a sincere conviction not based upon some grotesque error of fact —in the rightness of such and such an action. It does not concern " motives " other than the conviction of rightness or the sense of duty. Similarly, it does not concern the rightness of actions in which the agent is not so much as considering whether they be right or no. Such actions may occur. A man may act generously, for instance, without thinking about his generosity or about its rightness. It would be an intolerable piece of moral priggishness to hold that we must always be thinking about our duty if our action is to have moral worth. Indeed I should doubt whether a generous man must always be deemed capable of appreciating the generosity of his action if he gave his attention to that question. But I needn't here discuss the numerous complications that occur under this head. I am only asking the reader to restrict his attention to instances in which the agent is sincerely convinced of the rightness of such and such an action.

What Sidgwick described as the " subjectively right " action might also be described as the conscientious action. The word " conscience ", as commonly used, precisely defines the case. We

do not speak of conscience unless there is a conviction of right sincerely held according to the best of the agent's "knowledge and belief". Again, as Mr. Ryle has recently pointed out,[1] we use the term "conscience" only for what an agent believes that *he* ought to do. We make moral judgments about other people's actions, but have a conscience regarding our own actions only. So the word describes what Sidgwick called "subjective rightness" very precisely indeed.

Our questions then are (1) whether conscientious action should receive the commendation that Sidgwick gave to what he called "subjective rightness", and (2) whether it really is "subjectively right".

(1) If the agent's conscience doesn't err in any particular instance then his action in accordance with his conscience is plainly right in that particular instance.

If in any instance his conscience errs it must err either by deeming that to be right which is not right or by deeming that to be wrong which is not wrong.[2] It seems to me that in either case the conscientious action cannot be right. It cannot be right if the agent does what he falsely believes to be right; for right is trans-subjective and the agent's sincere conviction does not ensure its own trans-subjective validity. In the alternative case, I agree with Sidgwick that "no act can be absolutely right which is believed by the agent to be wrong".

That is another way of saying that when a man's conscience comes in, his conscientious action cannot be right if his conscience errs. Few would dispute this statement in the case in which the man conscientiously does what he falsely believes to be right, but many may be troubled by the other aspect of the affair, the case, namely, where the man acts in opposition to his sincere but mistaken belief that such and such an action is wrong. They would be troubled about the logic of the doctrine, and the more so because they would, I think, assent to the proposition that an action could not be right if the agent performs it against his conscience. An opinion, they would say, is true or false quite irrespective of what the opiner believes about it; but it would appear that an action is *not* right irrespective of the agent's conscientious beliefs. Why should there be so great a difference between "right" (in the moral sense) and "true"?

The answer doesn't seem to me to be difficult. Right means "right to *do*" (in the moral application of the term "right"). *Ex hypothesi* we are dealing with the sort of deed that is conscientious, that is with the sort of deed that from the nature of

[1] In *Analysis*, June, 1940. [2] I omit a false judgment of indifference.

the case is guided and determined by the conscientious convictions. It would be absurd if *such* a deed were wholly independent of the agent's conscience.

If, however, we allow that a man cannot do what is right if his conscience be in error we are not at an end of our perplexities. In that case is there nothing to be said except that the man's action cannot be right ?

I think that for the most part, if not always, we would commend the man who acts in accordance with his erring conscience (he being sincere and not a moral madman or a mere nit-wit concerning the matter-of-fact in the case) and would censure the man who does what we believe to be right (or even what we know for certain [1] to be right) against his own conscientious convictions. In doing so we should be quite consistent. The conscientious action, in other words, may always be *better* than the contra-conscientious even if it can never be *right* when the conscience is in error. Indeed in this statement there would be no subjectivity of principle. It is a statement to which all might assent as something true and trans-subjective, for it asserts that it is always better (although not necessarily right) for every man to act conscientiously than to act contra-conscientiously. If there are exceptions, these, too, may be matters of principle, not private affairs where the subject must always have the last word. What is applauded is the conformity of the action to the agent's sincere beliefs ; and that conformity, that relation, is not subjective in any important sense, although the subject's sincere beliefs are of course " subjective ".

(2) In the above discussion I have, by implication, repudiated Sidgwick's terms " subjective rightness " and " objective rightness ". What he called " subjectively right action " I have called " conscientious action ", believing myself to be describing the same thing as Sidgwick did. I have denied that the conscientiousness of any action suffices to make it right in any sense at all. Sidgwick would say that such an action was right in a way, namely, in the subjective way. I see no reason for believing that there is any such special brand of rightness, and have assumed that there is only one sense of (moral) " rightness ", namely, what Sidgwick called " objectively " or " absolutely " right. That assumption I should now like to assert. In doing this I have not dissented from what I take to be the substance of Sidgwick's view upon the important question whether in nearly all cases, if not in all, a conscientious action, even when the conscience is in error, is more highly commendable from a moral

[1] If we know anything for certain.

point of view than a contra-conscientious action. On the contrary, I have in substance agreed with Sidgwick. But the conception of the "subjectively right" appears to me to be a misleading conception, and not to be required for this or for any other purpose.

(*g*) It may be asked whether a distinction between "subjectively good" and "objectively good" may be drawn similar to the (rejected) distinction between "subjectively right" and "objectively right".

If "subjectively good" is supposed to mean "what so and so sincerely believes to be good although it may not be" I can see no legitimate reason for showing special tenderness towards such beliefs. If "good" is really a character of anything, mistaken judgments about it would be similar to any other mistaken judgments. If "good" is not such a character, *cadit questio*. The language of truth and error does not properly apply.

If "subjectively good" means "good-for me but not necessarily good-for you" there is no special difficulty. One man's meat may be another man's poison. In other words that which affects me in a way that is good may affect you in a way that is bad.

Could anything be good *in* me that was not good *in* you?

There might be contextual differences. Something that would be good if it were alone might not be alone in me or in you or in either of us. If it were in different companies and was improved in one company and corrupted in another, a meaning might be given to "good *in* you but bad *in* me".

Apart from such contextual differences, I should say that there is no meaning in "good in you but not in me" any more than there is meaning in the assertion that green could be green in one pea but not in another pea. The question as before is whether good is or isn't a character of anything. If it is, "subjective" goodness has no sense. If it isn't, the assertion "This is good" is only a sham. The sham may be that something immitigably private masquerades as something that claims trans-subjective validity, a pretence at objectivity on the part of something that is really subjective. If there were such a sham we should not be entitled to say that there is a "subjective" sense in which a trans-subjective term may be correctly employed.

XUM

IV.—WHY ACHILLES DOES NOT FAIL TO CATCH THE TORTOISE.

By J. O. Wisdom.

[*Abstract.*—Modern mathematical analysis, if relevant to Zeno's paradoxes, shows only that there is no contradiction in motion. But Zeno's arguments lose none of their plausibility thereby. To resolve them, velocity, position, length, moments, and time-intervals, need clarification. There are practical notions of these, involving approximate measurement to some required degree of accuracy, and absolute notions, psychologically substituted for these, which have no correspondence with physical reality. The paradoxes of the Achilles and dichotomy assume that indefinitely small intervals exist even though these cannot be measured. This is countered by the claim that if an interval exists it can be measured, *i.e.*, that an "interval" too small to measure has no meaning. Corollaries are that the dichotomy may be interpreted as an attack on "absolute rest", and that the dilemma whether Matter is infinitely divisible or infinitely divided is without meaning. Supposed mathematical solutions are rejected.]

The problem is not to prove that Achilles catches the tortoise, because we know that he does, but to find out where the "proof" that he does not is faulty and why it is convincing.

Zeno's second paradox may be put as follows. Suppose that Achilles runs twice as fast as the tortoise and that the tortoise has 64 yards start. When Achilles does 64 yards the tortoise does 32 and is still leading; when Achilles goes for a further 32 yards the tortoise does 16; and so on: thus the tortoise always clings to a lead, however small, so that Achilles, though he runs faster than the tortoise, never overtakes it. Thus the paradox is based upon the impossibility of reaching the end of an infinite series.

Let us express this in simple algebra. If the tortoise has a start of a units, the distance covered by Achilles is given by

$$S = a + \frac{a}{2} + \frac{a}{2^2} + \ldots, \quad . \quad . \quad . \quad (1)$$

which is a geometrical progression. It is easy to find the sum to n terms—in fact any book on elementary algebra will give:

$$S_n = a \cdot \frac{1-(\frac{1}{2})^n}{1-\frac{1}{2}} \quad . \quad . \quad . \quad (2)$$

and will proceed to the sum of an infinite number of terms by saying

$$S_\infty = \lim_{n\to\infty} \frac{1-(\frac{1}{2})^n}{1-\frac{1}{2}} = a \cdot \frac{1}{1-\frac{1}{2}} = \frac{a}{\frac{1}{2}} = 2a. \quad . \quad (3)$$

In the same time the tortoise goes

$$S = \frac{a}{2} + \frac{a}{2^2} + \frac{a}{2^3} + \ldots \quad . \quad . \quad (4)$$

$$= \frac{a}{2}\left(1 + \frac{1}{2} + \frac{1}{2^2} + \ldots\right) \quad . \quad . \quad (4.1)$$

$$= \frac{a}{2}(2) = a; \quad . \quad . \quad . \quad . \quad (4.2)$$

but it has a start of a, and therefore Achilles and the tortoise have both reached the same point. We should note that they take a finite time in doing so; for, if Achilles takes a time t to reach the point from which the tortoise started, his total time to reach the tortoise is

$$S = t + \frac{t}{2} + \frac{t}{2^2} + \ldots \quad . \quad . \quad (5)$$

$$= t\left(1 + \frac{1}{2} + \frac{1}{2^2} + \ldots\right) \quad . \quad . \quad (5.1)$$

$$= t(2) = 2t. \quad . \quad . \quad . \quad . \quad (5.2)$$

Zeno could of course interpose his first argument against motion: the dichotomy. According to this Achilles cannot even run to where the tortoise started from, since before doing so he will have to cover half that distance, and before doing this he will have to cover a quarter that distance, and so on, so that he will never be able to begin moving. (This may perhaps be more plausibly put in the form that to cover a certain distance he will have to proceed for half this distance, then half the remaining distance, and so on, so that he will for ever keep on halving the distance that remains and never arrive at his destination; to which we might add that since similarly he can never arrive at *any* destination, he can never move at all.) About this we may observe that it cannot be justly used to support the former argument, because in that Achilles is *assumed* to be able *to move*, and to have recourse to the dichotomy would be to go back on a postulate already granted. If, however, we subject this argument to analysis, we easily see that it is essentially the same as the other one; for the distance a to be run is

expressible in the same way as before, except that the terms are naturally considered in the reverse order, thus:

$$S = \ldots \frac{a}{2^3} + \frac{a}{2^2} + \frac{a}{2}, \quad . \quad . \quad . \quad (6)$$

so that S_∞ is equal to a.

Assuming that this mathematical procedure of taking the sum of an infinite number of terms is valid, there would seem to be no logical objection to be raised against Achilles running from one place to another; but does this explain either the fallacy in Zeno's dichotomy-argument or why it seems plausible? As to the validity of the procedure, which will be considered more fully below, its logical justification is held by some to depend upon showing that the limit of an infinite series exists, *i.e.*, that the series *converges*, on the grounds that the validity of convergent series has been put beyond doubt by mathematicians of the last century. Thus Mr. Boyer writes:[1] "There is no logical difficulty in the *dichotomy* or the *Achilles*, the uneasiness being due merely to failure of the imagination to realise, in terms of sense impressions, the nature of infinite convergent series, which are fundamental in the explanation of, but not in our obscure notion of, continuity." And again:[2] "Mathematics has, of course, given the solution of the difficulties in terms of the abstract concept of converging infinite series. In a certain metaphysical sense this notion of convergence does not answer Zeno's argument, in that it does not tell how one is to picture an infinite number of magnitudes as together making up only a finite magnitude; that is, it does not give an intuitively clear and satisfying picture, in terms of sense experience, of the relation subsisting between the infinite series and the limit of this series." I would suggest, however, that this does not sufficiently explain the difficulty: for no reason is given why the imagination should not demand an intuitively clear and satisfying picture except that this could not correspond in detail to a certain mathematical mode of expression (the aim of the paper may be said to be to amplify this point).

The most that we may strictly infer from the theory of infinite series is that there is no logical or mathematical objection to Achilles overtaking the tortoise! Achilles knows by trial that he succeeds, and he is now in no fear, once he has reached his

[1] C. B. Boyer, *The Concepts of the Calculus: A Critical and Historical Discussion of the Derivative and the Integral.* New York and London, 1939, p. 25.

[2] *Id.*, p. 44.

rival in the race, of running into a contradiction! But are we any nearer to understanding the error in Zeno's "proof"?

The cardinal feature of an infinite series is that its sum, when it exists, is not a sum in the ordinary sense of the total of a finite set: thus we may obtain the sum of

$$a + \frac{a}{2} + \frac{a}{2^2} + \ldots \frac{a}{2^n} \quad . \quad . \quad . \quad (7)$$

to any number of terms we please provided the number is finite, but the sum of an infinite series is a *limit* and is not a total of values *added up one by one*. Hence, though we may legitimately find the sum of an infinite number of terms, we cannot add up piecemeal the total distance covered by Achilles.

The position is, therefore, that we follow the progress of Achilles, first over the interval a, then over the interval $a/2$, then $a/2^2$, and so on, for as many of these as we wish, so long as they are finite in number, but we cannot watch him pass over the whole infinity of intervals. The mathematical sum of an infinite series may evade the necessity to cover *every* term separately, but Achilles cannot do so, and yet he must, apparently, cover them all if he is to catch the tortoise. Therein lies the inability of the mathematical solution to resolve the paradox. It is easy to see that the mathematical series does not correspond to the physical intervals traversed by Achilles; for, according to the infinite series, Achilles catches the tortoise and according to fact he does so too, so that, if this correspondence existed, Achilles would have to travel over a literal infinity of intervals. But it is not so easy to see why this correspondence does not hold. Any adequate resolution of the paradox must explain this.

A singular light is brought to the problem by the following interesting way of looking at it.[1] Suppose for definiteness that the tortoise is going at the rate of one inch per second and that the swift-footed Achilles is running after it at 500 inches per second, but *suppose in addition that the race is taking place towards the stern of a boat drifting forwards along a river at one inch per second;* then, to an observer on a bank of the river, the tortoise will appear to be *at rest*, and Achilles will be running towards it at 499 inches per second—nothing now can prevent

[1] For this idea I am indebted to a former colleague, Mr. C. G. Fernie, who made the suggestion in conversation. I may take this opportunity of acknowledging the benefit of discussions with Mr. Hugh Townshend and Prof. Max Black.

Achilles from reaching the tortoise (unless Zeno obstructs him with another paradox) and the paradox vanishes !

This way of looking at the matter brings home to us the difficulty of gaining an adequate conception of what would seem to be familiar : velocity. The relation between Achilles and the tortoise should not be dependent upon who watches their progress ; yet the paradox arises, and Achilles fails to reach his competitor, only for an observer on the boat, but attains his goal for an observer on the bank. We are tempted to ask if there is any connexion between this new paradoxical situation and the Special Theory of Relativity, according to which the velocity of a body is in a sense altered if the observer is in motion. This much we can say : that, if Apollo deputises for Achilles and runs after the tortoise with the speed of light, it follows from the Special Theory that Apollo will approach the tortoise with a relative velocity of the speed of light ; but this is his own speed, and therefore the potent Apollo runs after the tortoise with the speed of light no matter what velocity the tortoise has—no matter whether it moves or remains at rest ! For if the rules of transformation are

$$x' = (x - vt)/\sqrt{(1 - v^2/c^2)}, \quad . \quad . \quad . \quad (8)$$

$$t' = (t - vx/c^2)/\sqrt{(1 - v^2/c^2)}, \quad . \quad . \quad . \quad (9)$$

we have that the velocity of the tortoise relative to Apollo is

$$v' = x'/t' \quad . \quad . \quad . \quad . \quad . \quad (10)$$

$$= (x - vt)/(t - vx/c^2) \quad . \quad . \quad . \quad (10.1)$$

$$= (x/t - v)/(1 - x/t \,.\, v/c^2) \quad . \quad . \quad (10.2)$$

$$= (\mathrm{V} - v)/(1 - \mathrm{V}v/c^2), \quad . \quad . \quad . \quad (10.3)$$

where V is the velocity of the tortoise relative to a fixed observer. Now let Apollo move with the speed of light, *i.e.*, put $v = c$, and we get

$$v' = (\mathrm{V} - c)/(1 - \mathrm{V}/c) \quad . \quad . \quad (10.31)$$

$$= c(\mathrm{V} - c)/(c - \mathrm{V}) \quad . \quad . \quad (10.32)$$

$$= -c, \quad . \quad . \quad . \quad . \quad (10.33)$$

which is independent of V. It follows that relative to Apollo the tortoise is moving towards him with the speed of light, for all values of V. From the point of view of the tortoise this means that Apollo is overtaking it no matter what velocity it travels at.

What is most to be noted is that the velocity-experience of the tortoise depends on what observer is taking measurements. Now this concept of velocity, of the Special Theory of Relativity, is not an entirely *a priori* one but partly a result of a *scientific investigation*. Hence we ought to be chary about deciding offhand what are the velocity-situations of the tortoise and Achilles, and to realise thoroughly that velocity is not the common-sense concept it seems to be, *i.e.*, that velocity when scientifically used to fit facts such as the Michelson-Morley experiment is not quite what common sense supposes. Apart from the Special Theory, however, the lack of coherence between the paradox as given by Zeno and the vanishing of the paradox for the observer on the river bank is sufficient to make us analyse the notion of velocity if we are not to give way before Zeno's arguments. These considerations, therefore, warn us to be careful, even if they do not provide a basis for resolving the paradox; and they will not in fact form part of the solution suggested below.

What is the common-sense notion of velocity? It is simply the velocity with which a moving body is moving. A little reflection, however, shows that this is not so clear as it might seem at first sight. It seems to me that common sense has in fact two different notions of velocity, which are not recognised as distinct: (1) an absolute notion; and (2) a practical notion. We may consider the distinction by means of the contrast that exists between the common-sense or practical position of a body and its absolute position, and between the practical notion of the time when the body is at a certain place and the absolute notion of a moment; for, if we are to measure velocity, according to the practical notion, we must measure positions and distances and also moments and time-intervals.

Thus in assigning the position of a body we often regard the body, even when it is of considerable size, as being at a point: When we say that London and Liverpool are 200 miles apart, we talk as if a line 200 miles long joined the two points, London and Liverpool. Again, on the astronomical scale the sun is a point. Our practice would seem to be that an area that is relatively small is to be called "a point". There is nothing in experience to correspond to Euclid's definition of the word, which gives by contrast an absolute notion. Reflecting common-sense is apt unwittingly to disregard the practical concept and dwell upon an absolute one, which seems to be of something very small and of no size or of something of no size yet existent or finite.

Similarly, a length in practice is measured to within some degree of accuracy. Mount Everest may be measured to the nearest foot, the distance of the sun to the nearest million miles, the fit of a piston-rod to one-thousandth of an inch. In no case does the notion of an absolute length play a practical part. This many thinkers find extremely puzzling. They will feel: "Surely, though you can't measure more accurately than your instruments will allow, the interval or distance has an absolute length". The answer indisputably is in the negative, for to assign a length is to assign a number, and a number moreover that has a finite number of significant figures (integers or decimal places) and that belongs to a certain scale of measurement (for we cannot, for example, *measure* a length and say it is $\sqrt{2}$ inches); consequently, if the scale does not give a number more completely than to a certain degree of accuracy, an absolutely complete number cannot be assigned to the distance, so that the interval has no absolute length. The feeling of puzzlement probably arises from the belief that the absence of absolute length entails the absence of "real" distance, or further entails that distant objects are really at no distance from one another, *i.e.*, are next to one another. But no such thing is the case: the distance between two points is the distance that it is independently of any special mode of measurement; to ask what is that distance is to ask what is its length, and that can be given only within certain limits of error.

Again, times are in practice treated as approximate. Thus, in the case of a lecture timed to begin at 11 o'clock, it is likely that the hour is given correct to the nearest five minutes; a train should leave its terminus correct to the nearest half-minute; an athletic race is timed correct to the nearest tenth of a second. When, however, the plain man begins to reflect, he is inclined to think of a moment as absolute, a very small interval of time of no duration; and it is easy for him in logical matters to substitute the absolute notion born of reflexion for the practical one, which is perhaps rejected because of being approximate and so, from a psychological point of view, imperfect.

Lastly, a time-interval, being like a length measured to the nearest second, hour, light-year, and so on, according to requirements, is not in practice an absolute notion, but it easily becomes so on reflexion.

It is scarcely surprising that velocity, which is defined in terms of distance and time, should be thought of from the same two points of view. When the ordinary man wishes to know of the velocity, say, of a train in which he is travelling, he times it

over some finite distance; judges at athletic contests or motor record-breaking trials do the same; so does the physical scientist. Here we have the practical notion, depending on measurements made to a sufficient degree of accuracy for the purpose in hand. None the less there also seems to exist an absolute notion, not merely based on the supposition of an absolute distance passed over in an absolute length of time, but a notion of velocity at an absolute point of space at an absolute moment of time—which I can only describe by saying that it is thought of as the velocity during a moment so short that time has ceased to flow.

Now just as Euclid's definition of a point corresponds to the absolute notion of a point, so here the notion of an absolute velocity finds its mathematical counterpart in the differential calculus as rate of change of position, *i.e.* ds/dt. But this is a specialised mathematical entity, a *limit* approached by practical velocities though not itself a practical velocity in the sense of timed motion. Thus velocity in practice is motion over a timed interval; and to a number obtained in this way corresponds a velocity. But to the number obtained by ds/dt, not being derived in this manner, but being a mathematical limit, there cannot correspond a practical or physical velocity. This might be summarised by saying that nothing natural corresponds to ds/dt, though it is the limit of quantities to which there is correspondence in nature. A possible misconception should be removed: it is not suggested that ds/dt is contradictory or unimportant or that it cannot be defined satisfactorily for mathematical purposes, but simply that it has no correspondence with any physical velocity.

The contention is that alongside the practical notions of position, length, moment, length of time, and velocity, there are corresponding absolute notions; and that when we begin to reflect we substitute for the practical notions absolute ones, however contradictory or meaningless they may turn out to be on *further* analysis.

It is advisable for clarity to discuss briefly the connexion between absolute and practical on the one hand, and more or less approximate on the other. Practical measurements divide into more or less approximate; the less approximate, not being sufficiently exact for the purpose in hand, is usually thought of as inaccurate, and the more approximate, though merely good enough for some given purpose, is thought of as accurate or exact. Now it is clearly easy, if one is not very wary, to pass from thinking of what is exact to what is absolute; and the

present contention is that the absolute is not the result of better and better approximations, but that good approximations may be made better and better without becoming perfect or absolute, and that the absolute is a psychological conception, different from a very good approximation and having no counterpart in reality.

Let Achilles run, as described, to where the tortoise starts from, and let him then run to the place reached by the tortoise in that time, and so on ; but let us take a snapshot of the situation after a finite number of intervals have been traversed. Achilles will have gone a distance

$$S_A = a + \frac{a}{2} + \frac{a}{2^2} + \ldots \frac{a}{2^{n-1}}, \quad . \quad . \quad (11)$$

and the tortoise a distance

$$S_T = \frac{a}{2} + \frac{a}{2^2} + \frac{a}{2^3} + \ldots \frac{a}{2^n}. \quad . \quad . \quad (12)$$

The tortoise's lead will have been reduced to

$$\frac{a}{2^{n-1}} - \frac{a}{2^n} \quad . \quad . \quad . \quad . \quad (13)$$

or

$$\frac{a}{2^n}. \quad . \quad . \quad . \quad . \quad .(13.1)$$

Suppose that with the best instruments at our disposal we can measure lengths only to 1/1024 of a yard. There must come a time when according to our instruments Achilles has reached the tortoise : that is to say, measuring to 1/1024 of a yard, our instruments do not reveal any gap between Achilles and the tortoise by which it leads. But according to Zeno's argument the tortoise must always lead by $a/2^n$; and hence this mathematical lead is too small to be detected by our best instruments. Similarly, no matter how we might improve our instruments, the improvement could not keep pace with the diminution of the term $a/2^n$; for, the improvement in our instruments being fixed at any time, we could always make Achilles continue sufficiently far for the interval $a/2^n$ to be too small to be measured without further improvement in the instruments. On the present supposition this would occur if

$$\frac{a}{2^n} < \frac{1}{1024}, \quad . \quad . \quad . \quad . \quad (14)$$

i.e., if $\quad 2^n > 2^{10}a = 2^{10}2^{\log_2 a} = 2^{10 + \log_2 a}$,

or $\quad r > 10 + \log_2 a.$

In the illustration given at the beginning, the tortoise was supposed to have a lead of 64 yards, so that

$$r > 16,$$

which means that after Achilles had run 17 of the intervals described, he would be abreast of the tortoise, so far as we could tell from our instruments, while according to Zeno he would be still behind by $2^6/2^{17}$ or $1/2^{11}$ or 1/2048 or 0·0005 (approximately) yards.

That, however, is not the end of the matter; for, if we admit that Achilles has a velocity at this stage, as we must if he is to traverse the next interval, we are brought to the question of measuring his velocity. Now to measure his velocity at that time, we shall, as already described, have to time him over a measured length; in other words, *we must allow him to move a perceptible distance or one large enough to be measured;* but if we do that he must go at least 1/1024 of a yard, and he will at once pass the tortoise, provided its lead is sufficiently small. In fact if Achilles had completed 18 of the intervals, the tortoise's lead would be only 1/4096 of a yard, so that, while he goes forward the measurable amount 1/1024, the tortoise would travel 1/2048, which would give *Achilles* the lead: 1/1024 — 1/4096 — 1/2048 or 1/4096. Thus it is possible to calculate the number of intervals, which are the diminishing leads of the tortoise, that Achilles must traverse, such that the attempt to measure his velocity necessitates his going forward by an amount that gives him a lead. Zeno would doubtless point out that though this constitutes a lead on his own mathematical and dialectical grounds, yet it is not a *measurable* lead, as must be demanded by the present method of resolving the paradox. To overcome this difficulty we may say that if we permit Achilles to go 1/1024 of a yard there is no reason to restrict him to this; and in fact we may urge him to go two and a half times that distance, when his lead will be $2\frac{1}{2}/1024 - 1\frac{1}{4}/1024 - 1/4096$ or 4/4096 or 1/1024 yards, which is exactly the least measurable distance.

It is obvious that this way of resolving the paradox applies equally to the case where it is maintained that Achilles cannot run from one place to another because he first must cover half the distance, then half the remaining distance, and so on; but it is not applicable to the dichotomy, in which before traversing the distance Achilles must traverse half of it and before doing that he must traverse a quarter of it and so on, so that he can never begin to run because no initial interval could be travelled over until he had covered half of it. The difficulty is that Achilles

has here to begin at the far end of an infinite series! His distance is given by (6) and he has to begin with the dots. It is evident that he must cope with the dots at the beginning much as he has just coped with them at the end—by, as it were, jumping over them.

There are only two ways for Achilles to attempt to traverse the distance : one is by taking a flying start and the other is by starting from rest.

If he runs up to his starting post and has his velocity measured there, he could successfully move past it. Zeno would certainly protest, however, at such a *petitio principii*, since it would amount to allowing Achilles a preliminary canter before " proving " he could not move ; and Zeno would be right, for the difficulty is to get Achilles going, and not to keep him moving once he has started.

Achilles must, therefore, start from rest. There are then only two possibilities : either he starts from absolute rest relative to his surroundings, in which case there must be a discontinuity between this state and that of motion, or he starts from what is to all outward appearances rest.

In this context " absolute rest " does not refer to the Newtonian conception, but simply to a situation exemplified by a brick lying on the ground. If Achilles were like the brick, motion would be possible in two ways : through the agency of the force of friction or through collision with some already moving body. The latter would produce discontinuous motion, but it must be ruled out here, because, if we are inquiring whether a body in a state of " absolute rest " can begin to move, we are not entitled to posit some moving body until we can show that *it* can move ; besides there is no reason for thinking that Achilles is started by being given a bump. How, then, can Achilles move ? If he wore frictionless shoes he would not be able to start, as anyone knows that has tried to skate without pushing off with the edge of the skate. Friction is therefore required, and some dynamic force, biologically determined, must induce the friction ; and then motion suddenly comes into being quite discontinuously.

Unless we postulate the discontinuous generation of motion, it is difficult to see how motion could be generated at all from absolute rest, and once induced how it could be accelerated or retarded—Zeno's argument that Achilles cannot cover any distance without covering half of it, there being no ultimate fraction of the distance with which he can start, applies equally to show that Achilles cannot change his velocity, in particular

from rest or zero velocity to a positive one, or in general by accelerating or retarding. But, even if we do postulate the discontinuous generation of motion, we cannot explain how this could arise from a state of absolute rest, which by its nature contains the seeds of no change whatsoever. In short, Zeno's argument follows, *i.e.*, his conclusion about the impossibility of motion follows, if we assume that rest is absolute rest. Hence we may interpret the dichotomy as being an attack on the concept of absolute rest (this interpretation being without prejudice to Zeno's own intentions). If so, we should justify the answer that the plain man would give, if posed with the paradox of the dichotomy: "I shouldn't bother about the logical impossibility of an *absolutely* smooth start—I should just start!"

Turning now to rest in a non-absolute sense, which we may call "rest to all outward appearances", we may define this as meaning that the positional configuration of a body remains unaltered, though its constituents change. This may be illustrated by the metabolism of an organism, which may leave it the same "to all outward appearances"; what is meant is that in accordance with electron theory there can be continuous flux in the subatomic sphere though there may be no change in the macroscopic appearance. Once grant this and there is no difficulty in the idea of Achilles starting to run.

Whether the change from what is to all outward appearances rest to motion is continuous or discontinuous is another matter, and one not strictly relevant to the solution of the dichotomy, but a brief attempt to clarify the point may be permitted. We must ask for a criterion of continuity. Two kinds will at once occur to us: mathematical continuity, and steadiness. Mathematical continuity exists when a function can be made to differ from any assigned value of it by as small an amount as we please, by the procedure of making the independent variable, upon which the function depends, behave suitably. This is not to say the value of a function changes *steadily;* for the value of a function may change steadily without necessitating continuity—continuity is more stringent than steadiness. "Steadiness" can be used of curves, in the sense that between any two points an additional one can be found. If there is a physical counterpart to this, *i.e.* continuity or steadiness in the physical world, it would be that a body cannot pass from one place to another without traversing some intervening place—unlike what used to happen in early cinematograph productions.

Certain usages of "steady" should be noted. We can talk

of a steady fall of drops of water. This means that the drops fall *regularly, i.e.* that the regularity is steady ; this meaning is clearly irrelevant at present. Again, in a common usage, " steadiness " is opposed to " jerkiness " ; but this usage is not in question, for Achilles might start running jerkily or steadily —the definition of " physical continuity " just given would not exclude sharp angles. What we wish to know is whether jerky motion can in some sense be said to be continuous or steady.

We are clearly not concerned with the stringent criterion of mathematical analysis ; let us suppose, then, that " continuity of motion " means that between any two places reached by Achilles there is an intervening place also reached by him, or that between any two velocities attained by him there exists an intervening velocity also attained by him. If the contention of this paper is correct, there is no physical test for such a supposition when the intervals become too small to measure. Consequently the concept of *continuity of motion* has no application in the subatomic sphere. Motion is jerky or steady ; beyond that we can say nothing, for there is nothing to be said.

We may summarise the resolution of the dichotomy thus : When Achilles starts from what is to all outward appearances rest, there will be a gap between our measurements that show he is at rest and those that show the first measurable velocity, so that his initial motion cannot be represented by the dots of the series (6). This disposes of the paradox. If we ask further how he moves, we may be asking for *scientific* information about the subatomic universe. In this there cannot be absolute rest universally, or motion would be impossible ; the subatomic is dynamic. For this there is no reason—were it otherwise the universe would not be what it is.

It is now necessary to consider the paradoxes with reference to certain mathematical ideas. We wish to know what is meant by the claim that the paradoxes are resolved by modern mathematics. The claim seems to mean that the infinite series (1) and (6) can be summed in such a way that Achilles in the race paradox really does draw level with the tortoise and in the dichotomy really does move and reach his destination. If so, the claim must depend upon the theorem that a continuous function attains its limit : that is to say, not merely does the function represented by the infinite series approach a limit, which is its " sum ", but attains it. Now this theorem when properly stated is seen to hold only for " a closed interval " ; it is not true for " an open interval ". But an infinite series can be

defined for open intervals only; consequently no infinite series can attain its limit, and no mathematical solution of the paradoxes along these lines is possible.

Suppose, however, we try to make an adjustment, by asserting that the infinite series contains an actual infinity of terms, *i.e.*, $\aleph_0$. Then we might say that the series was a function defined for the *closed* interval $1 \leqslant n \leqslant \aleph_0$, and it would therefore attain its limit.

We may, it is true, introduce $\aleph_0$ as the number of numbers, for mathematical purposes, provided no contradiction ensues—and we may assume that no mathematical contradiction does ensue—but does this apply to the physical case, where Achilles is traversing physical intervals? That is to say, can Achilles traverse $\aleph_0$ *physical* subintervals? Since these would become smaller without limit there would be the physical difficulty of effecting the markings, on account of the limits to the degree of accuracy with which we can make measurements. No improvement in modes of measurement can even in principle lead to measurements of *absolute* accuracy; and any finite improvement, however great, entails that the number of measurable subintervals is finite. This objection would seem to be fatal to the project of obtaining $\aleph_0$ subintervals corresponding to a convergent series of numbers. The concept of $\aleph_0$ therefore makes no useful addition to a mathematical solution. Nor can Cajori's assertion be accepted, that "a full and logically correct explanation of Zeno's arguments on motion has been given by the philosophers of mathematics".[1]

There is a well-known way of dealing with the dichotomy, which consists of pointing out that the argument contains a false premiss. The premiss is this: the subintervals, being infinite in number ($\aleph_0$), would require an infinite time to traverse. (According to the above argument this makes no sense because there cannot exist an infinity ($\aleph_0$) of subintervals.) It is then pointed out that this premiss is false: for if an infinity of space-subintervals could exist and be added up to form a finite sum, the same would be true of time-subintervals, which would form a series corresponding exactly to that formed by the space-subintervals, so that, as it may be expressed, there is a one-one correspondence between the space-subintervals and the time-subintervals. However, it is difficult to see *where* this premiss is involved in the dichotomy, or even *that* it is involved.

[1] F. Cajori, *The History of Zeno's Arguments on Motion*, reprinted from *The American Mathematical Monthly*, vol. xxii., Nos. 1–9, 1915.

The present contention is that the dichotomy is valid step by step and falls to the ground only when it comes to the dots or the "and so on"—that is to say, that since the argument concerns physical subintervals and not mathematical ones they are finite in number, so that the argument cannot be repeated when the subintervals become too small to mark or measure out.

The foregoing account contains an assumption, an implication, or a principle—we may regard it which way we will. It is that an interval or distance is such that it has a length that can be measured by some instrument, however delicate and however much more refined than the human eye, or that can be subject to macroscopic observation—*entia non sunt multiplicanda praeter experientiam.* (I regard this as a principle and an implication but not as an assumption, on the grounds that the line of argument given above to resolve the paradoxes is relatively simple and concrete and should therefore be prior to a principle which is abstract and thus, when taken independently of its context, open to diverse interpretations ; in this context the principle is to be understood from the argument from which it issues.)

The question may now be asked : can there not be intervals or distances even if they are too small to measure ?—or, in a more sophisticated form, can there not be intervals whose length is an irrational number ?

What could be meant by an interval too small to observe ? Our whole notion of an interval is macroscopic in nature ; the question would, therefore, come to this : what would an ultra-microscopic kind of macroscopic interval be like, or could ultra-microscopic intervals form a species of macroscopic intervals ? This resembles the question : what colour is an object that is too small to reflect light ? In this form the question is seen to be without meaning.

Doubtless there is a certain psychological difficulty to be experienced in accepting such a solution. If the state of the physical world and of our instruments were such that improvements in measurement were never met with—if, for example, we can imagine that all measurements were whole numbers of inches and that it was impossible to subdivide the inch—then we should easily agree that what cannot be measured does not exist. What gives rise to bewilderment is that, according to this solution, if our powers of measurement improve there will *ipso facto* be something existent to be measured that did not exist before the improvement in our powers of measurement —improvement in measurement seems to *create* something in the physical world, to *create matter.*

What must be realised is that what is thus created is macroscopic—we are not adding to the " ultimate ingredients " of the universe. In this, after all, there is nothing surprising; for we create something out of nothing in the macroscopic field when we shine on any object a light of a colour never before shone upon it, so as to render possible new percepts. We do not thereby add to the ultramicroscopic elements of the physical world.

Thus the age-old dilemma, " Is Matter infinitely divisible or infinitely divided ? ", is to be answered by saying that Matter is divisible only to a degree limited by the level to which macroscopic observation can be carried; beyond this the dilemma has no meaning.

To summarise the resolutions of the paradoxes: The notion of approximate as opposed to absolute measurement shows that there cannot be an infinity of measurable subintervals; the concept of a physical interval is bound up with its being macroscopic and measurable; consequently it is meaningless to talk of ultramicroscopic intervals, which cannot be observed or measured. Of intervals and such like entities—though not of chairs and the like—we might say that their *esse* is *percipi* and that an unexperienceable interval is an *abstract idea*. The paradoxes assume that physical intervals correspond to mathematical ones; but this is not the case, for the former can be associated only with approximate measurements whereas the latter can be assigned absolute quantities. The paradoxes are plausible because we think of mathematical magnitudes in a physical context.

V.—CRITICAL NOTICE.

Psychological Issues. Selected Papers of ROBERT S. WOODWORTH. Columbia University Press, 1939. Pp. x + 421. 22s.

THE name of Prof. Woodworth is one of the first that comes to the notice of the student of Psychology. Woodworth's *Psychology, a Study of Mental Life*, published in 1921, is often the first book he reads on the subject, and he finds it sensible, easy reading, a little unexciting, but packed with information. More recently, in 1938, was published the compendious *Experimental Psychology*, perhaps one of the most useful books to be found on the shelves of lecturers and advanced students.

What is his claim to fame? "I should have liked", he says, in the short Autobiography at the beginning of this collection of his contributions to psychological journals, "I should have liked to be a discoverer, so that anyone asking, 'What did Woodworth do?' would promptly be answered, 'Why, he was the man who found out' this or that". But he was no discoverer; he belongs to that large and important army of patient investigators and sensible critics, whose names do not always go down from one generation to another, because there is no famous, and possibly exploded, theory to which they are attached.

If you can startle the world with a theory, however fantastic, you are assured of a fitful immortality on the lips of living men. First you will be personally attacked, next you become an examination question, and then, after a passage through the Valley of Death, you will be resurrected by the Historian, who puts you into a book on the 'History of Human Ideas', and you live again in the Paradise of the Well Informed.

While some kind of immortality can be expected by those whose theories are dead as mutton and buried in ridicule, a more certain persistence awaits those who have given the scientific wheel a definite turn. But what of the sensible plodders? They will, perhaps be forgotten, but while they are with us, it is well that they should be remembered. This is why we welcome this collection of Prof. Woodworth's papers.

I speak of distinguished Psychologists as giving the scientific wheel a turn, but is this the right simile to use? Is the development of psychological theory to be likened to the turning of a wheel, which will eventually drag Truth from the bottom of her well? Or should we not rather speak of a ship, sailing towards the port of

Final Knowledge? Perhaps it is better to think of our progress in terms of a journey. We certainly do not know yet which way we ought to go. We are impelled violently in one direction by the Behaviourists, then off we go in the direction of the Psychoanalysts, and again we get blown in yet another direction by the Gestaltists. But the sensible plodders are there to correct our more extreme deviations.

The changes of direction which have been brought about by Freud, by Watson, by Koffka and his collaborators, have had a permanent influence on our final path, but the work of the less dramatic navigators has had just as determining an effect. It is they who drag us back from our wild excursions, and because they drag us *back*, they cannot help giving the impression of impeding our progress and reversing our motion.

What more reactionary than Prof. Woodworth's firmness on the subject of the Mind? And yet, how salutary his reminder that if we allow Psychology to dissolve through Physiology into Chemistry and Physics, we shall have to build up a new science to cover all the features in the world which are necessarily omitted from such a scheme.

From this point of view the first group of papers in this book is the most interesting. Here are some of the titles: 'The Cause of a Voluntary Movement', 'Imageless Thought', 'Non-sensory Components of Sense Perception'. In all these essays we are reminded that if you develop a theory based on certain principles which 'must' be accepted as the necessary material for the psychological structure, you find yourself involved in implications which 'must' be the case, but which in point of fact may very well not turn out to be the case at all.

"My bogey *men*", says Prof. Woodworth, "the men who most irritated me, and from whose domination I was most anxious to keep free, were those who assumed to prescribe in advance what type of results a psychologist must find, and within what limits he must remain."

Let us examine the arguments against one of the "epistemological tables of commandments", as he calls them, which is concerned with what 'must' be the relation between body and mind.

If you are playing cards and decide to take the nine of trumps out of your hand and fling it on to the table, you can perform the feat when you want to. What happens? If you analyse the situation you can find sensory elements about the production of which you tell a long story about light rays and the optic sector. Then you find muscular contractions, and you tell another story about the motor nerves. But what sets the motor nerves in action? How can we bridge the gulf between the light rays and the movement of the hand, as we say: 'playing the card'?

The light rays cause sensations. Well and good, but how can sensations cause movements? They cannot, but they can arouse

images, and we know that images are only weak sensations. The neural disturbance which '*is*' a sensation causes further, but weaker, disturbances which '*are*' images. This is managed by means of nerve paths of reduced resistance. And the motor nerves? We are coming to them. When they were excited, and caused movements, long ago, these movements aroused sensations and these prepared the way for kinæsthetic imagery. Furthermore, we know that the image of a movement '*is*' a weak incipient movement, which only needs a slight push to become overt and operative.

The story is ready. The light rays from the nine of trumps cause visual sensations, which cause associated motor images, which develop into movements. The passage through the human frame from a light ray to the flight of a playing card through the air is now complete.

The patient investigator now comes forward. He makes his students perform simple acts. "Some of the movements made, such as opening the mouth, wagging the jaw, winking, opening the closed eyes, flexing or separating the fingers, and flexing the foot, were 'free' in the sense that motion was not communicated to any external object; in other cases, some instrument, such as scissors, forceps, or the dynamometer, was manipulated." When they are asked to report on their imagery, it is either found that there are no kinæsthetic images at all, or that what images there are do not correspond with the movements that are made. Actually the subjects seem to think about what they are going to do, and not about the muscular sensations which they are about to receive.

At first this seems a trivial conclusion to arrive at—it is just what we should expect. But its significance lies in its corrective value.

A great deal of behaviour begins with a set of physical events—air-waves or light-rays—and ends with a physical event—the displacement of a piece of matter. The most natural thing to do is to try to link up these two ends by means of other physical events of the same order. There, after all, is the body, which is impelled by air-waves or light-rays in the first place, and impels the piece of matter in the end, and we know that there is a system of neural conductivity running through the body.

Now the neural disturbance set up by the electro-magnetic stimulus, may be already linked to a motor sector, and thus the chain of neural events is short-circuited. This is what happens with reflex or habitual response.

With voluntary action, however, the case is different. "Voluntary movement", says Prof. Woodworth, "is clearly movement that is foreseen and intended. There must therefore be in the mind an idea of the movement, and as such an idea could result only from previous experience of the movement, it will consist of reproduced sensations, sensations originally produced by the movement." Such is his statement of what 'must' be the case, if the 'anti-mental' theory is correct. The point is that if you are going to avoid a

'*mens ex machina*' to set the motor nerves going, and if you cannot fall back on pre-established direct connexion between the stimulating sensation and the act, because of the obvious difference between voluntary and involuntary action, and if the sole causative force you allow yourself is the force of association, then you are ruined if you cannot find the associated motor images which either *are*, or develop into, the acts of which you are giving an explanation. Now we can see the force of the apparently trivial discovery that imagery, which 'ought' to be *present*, is absent, and absent it certainly is in the hum-drum card-playing example. Can it be maintained for one moment that we have images of gripping and throwing the card? Obviously not. What we do have are the reflections which lead up to the decision to play it, and while we are, of course, perfectly aware that we *are* playing it, the actual flinging of it on to the table certainly does not bulk large in the field of attention.

What, then, after all this, *is* the cue for voluntary actions? "The cue of the act", says Prof. Woodward, "is the thought, not the image. The most definite feature of the thought is the cause of the definiteness of the act. If it be allowed that there is much mental content that is not reducible to sensorial imagery, and that some of this content usually lies at the focus of attention, constituting the real point and meaning of the thought, no reason remains for supposing that there 'must be' a sensorial image of the act which shall function as the cue of the movement."

But surely, it might be objected, a 'thought' must be so clothed that you can say that the thought and its clothing are one. Not so. "A naked thought can perfectly perform its function of starting the motor machinery in action and determining the point and object of its application."

This is going far in the direction of giving mentality an independent status.

Prof. Woodworth does not shrink from this. In two essays on Imageless Thought he drives the point home: you cannot dissolve 'thought' into its attendant imagery. "I would suggest", he writes, "that in addition to sensorial elements, thought contains elements which are wholly irreducible to sensory terms."

In pursuit of the same aim Prof. Woodworth attacks the problem of our 'Consciousness of Relation'. He denies that our awareness of relation can be reduced to feelings. Why should anyone hold such a view? Because there is no physical stimulus in such relations as 'betweenness', or 'larger than', which could set up a disturbance in the nervous system corresponding to a sensation, and the only other correlate to physiological disturbance which we can fall back on is 'feeling'. Physiological disturbance there 'must' be, the physiological disturbances which correlate with feelings can be internally caused, therefore there 'must' be feelings of relation.

Again, patient investigation shows that no specific feelings are present which correspond to the relations we perceive. And, indeed,

argument would be futile if, when you say that D has the same relation to C as B has to A, all you mean is that you have the same feeling when you pass from C to D as you have when you pass from A to B. And yet, if you have placed all your eggs in the physiological basket, that is the kind of thing you have to say.

The fact is that the moment you admit elements in consciousness other than sensations or feelings, you abandon all known physiological interpretations. The correlates of neural disturbance are sensations, images and feelings—something presented, '*anschaulich*' —and vice versa, the correlates of sensation and feeling are neural events. If, therefore, in the commonest occurrences of human life, the awareness of relations, the reflexion about them, the decision to act and the determination which follows, you cannot reduce these occurrences to sensation and feeling, it looks as though mental life and physiological process do not even run parallel, much less can they be identified. Furthermore, if we find, as we do find, that there are a great many quite irrelevant images and feelings which encumber our mental life when we go into action, we cannot justifiably ignore the physiological correlates of these when giving a physiological account of our behaviour. Over and over again it happens that odd images crop up when we are told to carry out a simple task, and this means that the pattern of physiological happenings must be quite different from the pattern of mental happenings, so far as they can be correlated at all. It is hardly an exaggeration to say that the imagery to which we *can*, or think we can, point to a physiological correlate frequently seems quite irrelevant to the behaviour we are trying to explain, with the result that the items that seem important have no obvious physiological correlate at all, while those which we consider inessential are the only ones which have. Why should we not say that the effective factors are 'mental', but that neural structure is responsible for certain incidental disturbances, due to neural leakage?

But this is not all. The stimulus to action itself is not reducible to sensory terms. The nine of *clubs* means one thing when clubs are trumps, and another when they are not. In Bézique the Queen of Spades has special value, in Belotte, the nine of any suit has a special value; it all depends on the 'situation-and-goal set' as Prof. Woodworth calls it. This again is not reducible to physiological terms. The sensory stimulus from the nine of clubs may be much the same from time to time, but the significance of it varies, and it is the significance that counts when you are playing cards. Besides this, we can switch 'at will' from one meaning to another, and what kind of physiological account can we give of that?

We turn to memory, the stronghold of much physiological theorising. Is remembering the recapitulation of previous experience in its entirety? Not at all. It is based on what Prof. Woodworth calls "an innate reaction to sensation". "Each perceptual reaction is specific, and contributes a specific content. In recall, it is these

perceptual reactions that are revived, and not sensation; and therefore the content of recall is never, in the strictest sense, sensory." And, again, " All recall is of facts previously noted, freed from the concrete setting in which they occurred when noted ".

The ' replica ' theory of memory breaks down the moment you look into it, and yet reduplication is the only possible theory if you cling to physiology.

We note that Prof. Woodworth uses the word ' reaction '. The ' reaction ' to the sensory stimulus is ' mental ', that is to say, something non-physiological *does* something—selects, notices, understands. If this is the true account of the story, to what are we committed ? If we do say that there are independent mental events, can we leave them, as it were, in the air ? If we say that there is *action* do we not have to admit a persistent actor ? How convenient it would be if the Physiological story were true !

Understanding the situation, then, must be added to reflexion and decision as features of mental life which transcend physiology, unless, of course, we rely on the ' frontal convolutions ' to help us out. When in difficulties the rule seems to be to put your faith in the ' frontal convolutions ' ; after all we know so little about them that we can always take the line : " Understanding occurs, it ' must ' have a physiological correlate, we have not paired the frontal convolutions off against anything else, so they ' must ' be the place where understanding occurs ". Surely we cannot approve of such blind obedience to the ' physiological imperative '.

All this, it may be said, leads us nowhere. In fact we are back again where we started, with dear old common sense. This is true. The enormously important contributions which we owe to the physiological approach have carried us away, and the correction administered by Prof. Woodworth has saved us from extremism, but it has the appearance of a regressive, rather than a progressive movement. It is a necessary check, but which way shall we advance now ?

The answer to that question lies in the future, but one thing is certain, and that is that we shall not get much farther until Psychologists themselves have got rid of their prejudice against the ' Mind '.

Doubtless this prejudice in favour of ' matter ' is deep-seated and doubtless the Freudians have a name for it, but Prof. Woodworth, we feel, would not be satisfied with their interpretations.

On the subject of Freudian Psychoanalysis Prof. Woodworth has some interesting things to say. He pours ridicule on free-association as a method of discovering ' complexes '.

" Can the Psychoanalyst ", he asks, " seriously uphold the proposition that, whenever the thought of A has come into my mind, if I then let my mind move freely from A and reach B (sooner or later), B must have been operative in making me think of A in the first place ? And how does he know when to stop in the series of thoughts starting from A, in order to get the particular idea or wish that was unconsciously at the bottom of thinking of A ? "

These are not easy questions to answer, and if Freudian theory really forced us to believe that *whenever* free-association takes place, "what A arouses is conceived as arousing A", we should demand a reconsideration of the theory at once. The correction which Prof. Woodworth makes in the course along which we are impelled by Freudian theory is that we must distinguish between factors which have powerful unconscious determinants and factors which have not. But how is this to be done?

The Freudian is apt to sneer—not without cause, sometimes—at the niggling, boring 'normality' of the psychological laboratory. One cannot help wishing that he would take 'normality' more seriously as a steadying influence to his more exciting flights.

Prof. Woodworth also attacks Freudian Psychology with the old turning-the-tables argument. If the most significant features of a person's life spring from sexual repression, what about the theories of the Freudians themselves? There is nothing new in this line of attack, but it is always a good thing to remember to test a man's theory by applying it to itself. The upshot of Prof. Woodworth's argument is that if you start free-associating from any item in consciousness you will be bound to reach a sexual item sooner or later, and the Freudians, being on their own showing predisposed to seize on such material, raise a purely fortuitous association into a position of undeserved importance.

In fairness to Freudian theory it must be observed that Prof. Woodworth's paper was written in 1917, and that he takes no account of the contributory evidence for the importance of sexual repression. In fairness to Prof. Woodworth we must quote his view that "Even though the methods of the Freudian psychology are thus faulty, the doctrine might still be essentially sound, being based not on the evidence brought forward, but on great acumen in detecting the real state of affairs". How one could come to that favourable judgment, without accepting some of the evidence brought forward, it is not easy to see.

There is not space to discuss all the other topics dealt with in this volume. There are papers on such diverse subjects as 'The Rapidity of Dreams', 'Racial Differences in Mental Traits', 'The Influence of the Improvement in one Mental Function upon the Efficiency of other Functions', and a paper on the physiology of Cardiac Reaction. From the theoretical and philosophical point of view, the papers which have been mentioned in detail are the most interesting, and we are glad that they have been made collectively accessible to psychologists and philosophers, both of whom might read them with profit.

W. J. H. SPROTT.

VI.—NEW BOOKS.

Charles Peirce's Empiricism. By JUSTUS BUCHLER, Ph.D. With a Foreword by Prof. ERNEST NAGEL. London: Kegan Paul, Trench, Trubner & Co., 1939. Pp. xvii + 275. 12s. 6d.

THIS is a sympathetic, though not uncritical, account of an important side of Peirce's philosophy. Peirce liked to describe himself as a 'laboratory philosopher' and wrestled continually with the analysis of empirical knowledge, especially of scientific method. Too often he hinted at, rather than stated, his views, but as expanded and interpreted by Mr. Buchler they seem remarkably in tune with present-day discussion. It is unfortunate that circumstances, including his own habits of writing, deprived Peirce of a greater influence on his contemporaries. Had this not been so many mistakes might have been spared about 'logical atomism', the 'ultimate analysis' of common-sense propositions and the justification of induction. For Peirce's doctrine of fallibilism stresses the inevitable vagueness, corrigibility and hypothetical character of all empirical propositions. It follows that logical certainty with regard to any of them is impossible. We can establish them with reasonable probability by the approved methods of science. Both the methods and the propositions they establish are justified as those agreed upon by competent investigators. They neither require, nor can be given, any further logical guarantee such as rationalist philosophers have demanded. Nevertheless, there are obscurities in Peirce's doctrines too, which Mr. Buchler does not always illuminate.

The book is divided into three parts, consisting of numbered sections, not chapters. Part I expounds Peirce's 'Critical Common-Sensism' based on Reid but modified by fallibilism which denies intutitive or certain knowledge even of common-sense propositions. Part 2 discusses Peirce's version of Pragmatism, and Part 3 the relation between some of his views on formal logic and his empiricism. Part 1, perhaps the most important, is the least satisfactory. Some of the sections are such a brief résumé as to be almost unintelligible. Section 9, *e.g.*, on Peirce's use of 'Self'. Peirce asserts, against Descartes, that knowledge of the Self is not intuitive but inferred. His view seems to be confused, however, and Mr. Buchler does not clarify it. The word 'Self', according to Peirce, may be defined empirically and unambiguously. For instance, it may be the class of activities generated by the sense organs or a class of certain mental activities. But the question of *whose* activities and how they are determined is not thus answered. Probably no answer is needed except that they are 'my' activities, but this should be explained. This brief section ends with a mysterious quotation from Peirce. "Everyone will admit that a personal self exists in the same sense in which a snark exists: it is an illusory phenomenon, but still it is a phenomenon". It is not quite an illusion, since men are 'selfish', *i.e.*, delude themselves into supposing

they have an isolated existence, and so far they have it. But what does all this mean? Is Peirce asserting that every proposition in which 'I' occurs is false or only partly true? Does everyone admit that he exists in the manner of a snark or a unicorn? Could anything be more absurd? Peirce was more aware than most philosophers that senseless metaphysics may result from mistaking a linguistic question for a question of fact. Like many other philosophers, however, he seems to have been led into this nonsense about his own existence by expressing a question about the use of 'I' in the grandiose form of the Problem of the Self.

As a counter-attack to misplaced rationalism Peirce's fallibilism is undoubtedly useful. But although logical certainty is irrelevant to empirical propositions it does not follow, as Peirce and Mr. Buchler both agree in supposing, that we can never be certain of any, *i.e.*, can never know them. And a proposition known to be true cannot be corrigible for 'I know p but perhaps $\sim p$' is nonsense. Empiricists are shy of certainty for fear it commits them to some doctrine of ultimate elements (*e.g.*, events or sense data) known by a mysterious faculty of intuition. But no such metaphysical embroidery is involved. What follows from such a view as Peirce's is that propositions like the following should make sense in English and they do not. 'I believe I am in pain but I am not quite sure.' 'I think I am now reading these words printed in black on white paper but perhaps I shall find I am mistaken.' That all propositions must be either logically certain or equally corrigible is a rash bifurcation of which fallibilist philosphers should surely beware. What types of certainty are applicable to different propositions must be determined by examination not by legislation.

Mr. Buchler gives a useful account of Peirce's Pragmatism in Part 2 and makes some interesting comparisons with contemporary logical positivism. Pragmatism, with Peirce, had little in common with the cheerful uplift on 'the true' and 'the useful' which later became associated with the name. It was with him a verificationist theory of meaning which tried to avoid the subjectivism and consequent solipsism of the current sensationalist positivism of Comte, Mach, and Pearson. It is interesting to see how much Peirce was aware of these traps into which later positivists again tumbled headfirst in the palmy days when all propositions were translatable in terms only of 'my' experiences and the world and life were one.[1] Peirce liked to give himself the medieval label of 'realist' as opposed to 'nominalist'. The nominalists denied that general terms are the names of universals. They are a convenient linguistic device under which to collect classes of individuals. The Machian positivists of Peirce's day denied that there are 'really' any natural laws. So-called laws are merely a convenient shorthand for the recording of innumerable sensible facts. They are useful fictions, economy devices created by scientists. For nominalist and descriptionist generalisation is forced upon us by the weakness of our memory and attention. God, whose capacity is infinite, knows nothing of classes or natural laws. Peirce, who started not from 'facts' but from the use of symbols, saw that this was nonsense. What cannot be communicated is not known; we cannot communicate without language and what would a language without general terms be like? We could not 'ideally' refuse to use class names or formulate laws if we did not wish to economise thought, for we could say nothing if we did. In

[1] The world and life are one (Wittgenstein, *Trac. Log. Phil*,, 5, 621).

this he seems completely right. Now what exists can be described in a true proposition, and some propositions, including those which express natural laws, are true. There are, therefore, classes and natural laws and to believe that there are is to be a realist, in Peirce's sense. But how are natural laws established? How are propositions discovered to be true? The answer is, by applying certain methods, observing certain rules, doing certain things. The methods are gradually established by scientists and other competent investigators. An empirical proposition is, therefore, a prescription to perform certain actions in accordance with the rules, and the true opinion is the one about which all those competent to apply the methods, agree. This, roughly, is Peirce's pragmatism. What exists is that about which general agreement has been reached and investigation satisfied. 'It is consensus or common confession, universal agreement, which constitutes reality.' But again, it seems queer to say that 'Mont Blanc exists' is true because we all agree that it does, although such agreement is an important criterion of truth. The positivists stressed personal experience and overlooked publicity; Peirce did the opposite. But both at least are necessary. The question of what constitutes the nature of what exists is, I think, nonsensical. Peirce's discussion of the social factors in the establishing of true propositions is, however, very important.

I have no space to mention the many other topics discussed in this interesting volume. I hope, however, enough has been said to indicate its worth. It is an admirable introduction to Peirce, who has too long awaited adequate recognition.

MARGARET MACDONALD.

Bishop Butler, Moralist and Divine. By J. NORTON, Jr. New Brunswick: Rutgers University Press, 1940. Pp. xi, 336.

As Mr. Norton says, the number of monographs dealing with Butler is not great. I hardly think, however, that he has been wholly well-advised in swelling that number by the publication of the present volume. Its apparent object is to argue that the ethical theses of the *Sermons* only become fully defensible when understood as dependent on theistic metaphysical presuppositions which may be discovered in the *Analogy*, but are, in Mr. Norton's opinion, at the best dubious. (At least this is what I take him to be maintaining, though I have to admit that, owing to what is to me a strange use of the English language, I am often left uncertain of his precise sense.) If this is true, it obviously very much diminishes the permanent worth of Butler's work. But is it really true? From the concluding chapter it appears that Mr. Norton's last word on the moral philosophy of his author is that Butler deserves great credit for proving convincingly the existence of 'conscience', or the 'moral sense', but that he has entirely failed to prove its sovereign authority: that stands or falls with a theistic interpretation of the work which remains dubious. If this is so, Butler has only proved something which he is in fact content to regard as patent to anyone who will practise a little honest introspection and is modest enough to admit that the ethical writings of other men presumably have some meaning. What he has wholly failed to prove is the very doctrine which he regards as fundamental and as making all the difference between his own ethics and those, *e.g.*, of Shaftesbury, the proposition that sovereign authority is 'part of the very notion'

of the reflex principle of approbation and disapprobation. And he has done nothing to justify the assertion in the Preface to the *Sermons*, that the utmost conceivable degree of theological scepticism leaves our 'obligation to virtue' unaffected. If the authority of conscience is itself only an inference from questionable metaphysical assumptions, this claim can be no longer advanced. Hence, whether or not Mr. Norton is right in holding this view, it should be clear that it was not the view of Butler.

In point of fact, the considerations Mr. Norton relies upon seem to me to involve a bad confusion of thought. "Conscience", he argues, cannot have the paramount authority ascribed to it by Butler, since non-moral judgements, like those of æsthetics, also deal with 'value', and it has not been shown that the authority of moral judgements is superior to that of æsthetic. Now what does this mean? In their own sphere the judgements of æsthetics are, of course, paramount: it would be irrelevant to depreciate the æsthetic merits of a work of art on moral grounds. But that is not the point at issue, as far as Butler is concerned: the sovereignty he claims for conscience is simply a supreme right to direct the course of our actions. We are to put to it the question 'is this act I am now going about right or is it wrong', and when we know the answer we are under an obligation to act accordingly. There is here no question whether the judgements of *Geschmack* are, in some sense or other, 'higher' than those of 'conscience'. The question is only whether when 'conscience' condemns a projected action, I may override the condemnation and do the act on the plea that it has 'æsthetic' value. And I hardly think Mr. Norton himself will contend that I can do so without immorality.

I do not propose to discuss Mr. Norton's elaborate exposition and discussion of Butler's account of the relations between 'the particular passions', self-love, benevolence on principle and conscience. It appears that Mr. Norton thinks his statement an improvement on any which has preceded it, but—the fault may of course be mine—I find the exposition much too misty to be followed. Self-love, benevolence, conscience all seem to melt in Mr. Norton's hands into the same thing, with the result that any one of them may be said, with as much justification as any other, to be the 'supreme principle'. I think this is bad moral psychology, and I am sure that, good or bad as psychology, it misrepresents Butler. I suggest tentatively that Mr. Norton is reading Butler too much in the light of the ethics of 'self-realisation' taught by T. H. Green, and that this is an unhistorical method of exegesis. And I feel sure that Mr. Norton's obscure and puzzling accounts of the relation between 'conscience' and 'reflexion' are occasioned by a misunderstanding of the sense in which Butler uses the second word. When he speaks of a 'reflective' or 'reflex' principle, he does not mean, as Mr. Norton seems to suppose, a principle of 'speculative' thought: he means a principle of self-judgement. 'Conscience' is not related in complex ways to this principle; it is identical with it, because, in my moral verdicts on my own actions, I am at once the judge and the culprit brought to the bar; my judgement is reflected or bent back upon myself. The vaguer use of the word 'reflexion' to mean simply 'thinking' would obscure Butler's point. Unless this point is clearly understood, the force of Butler's argument for the *manifest* authority of conscience can hardly be appreciated. The point is, as Butler might have put it, that the only work the 'reflex principle' *can* do is to *judge* my *own* conduct, just as the only work my eyes can do is to see; this is its proper work, and *therefore* in this sphere its verdicts are final.

I note, by the way, as evidence that Mr. Norton is not sufficiently at home with his author's diction, the singular interpretation he puts upon the well-known sentence about conscience as 'always and of course anticipating a higher judgement which shall some day confirm its own'. Butler means, of course, that conscience anticipates in advance the verdict which will yet be pronounced on me by God at the Day of Doom. But Mr. Norton contrives somehow to extract from this simple language the sense that the verdict given by my conscience to-day is always liable to be reversed 'on better advisament' by my conscience to-morrow! This is as unfair to Butler in one way as the charge of religious intolerance brought against him by Mr. Norton is in another. The intolerance is supposed to be proved (1) by Butler's repudiation of the claims of the Papacy, (2) by his disapprobation of the proceedings of the Methodists at Bristol, but as to (1), there is no 'intolerance' in rejecting the claims of the Papacy, and as to (2) Butler was Bishop of Bristol at the time, and only doing his duty as Bishop, if he thought that the Methodists were acting in an unwarranted way, in urging Wesley to withdraw from the diocese. Mr. Norton forgets that Wesley was an Anglican priest, and as such bound by the administrative rules of his Church, its 'service regulations'. If he had been a 'Dissenter', the case would have been different. (True, Wesley's own professed view was that his commission as a priest authorised him to intrude into any diocese in England independently of its Bishop, but this was not the generally accepted view, and I should suppose it is very doubtful whether it would bear examination.)

A. E. TAYLOR.

Knowledge and Character. By J. C. MAXWELL GARNETT. Cambridge: At the University Press, 1939. Pp. xii + 358. 18s.

DR. GARNETT'S philosophy of education was first expounded in his book *Education and World Citizenship* in 1921. The present volume restates his thesis rather more simply, and takes into account some of the educational and psychological advances of recent years. He shows the links between educational theory, the psychology of cognitive and orectic processes and the factorial studies of Spearman and others, and relates them to the ideals of Christianity and of the League of Nations. The central idea is that: "Wide and diverse experience linked to expert knowledge and skill so as to form a single interest (rather than several separate interests), and all dominated by a supreme purpose in harmony with those of one's fellow citizens, is therefore to be the aim of education . . .". The book is indeed a remarkable illustration of this idea, with its integration of many divergent fields of interest into a clearly thought-out and unified scheme.

The application of the thesis to secondary and to University education is clearly shown. At present there is too much teaching of separate subjects; and the "broad foundation" upon which higher education is supposed to rest is, in reality, a lot of "loose stones". It is more difficult to see how it could be applied to the primary education of children under eleven years, or indeed whether it does not pre-suppose a level of intelligence and culture comparable to that of the author himself. Thus it fails to show how the antagonism to school-work and to organised religion which is so widespread among the average and duller public schoolboys and students can be overcome.

That the book is a distinguished contribution to education, and an interesting and inspiring revelation of the credo of a humane mind, all would admit. But to the psychologist it appears that the author's psychological analysis is frequently unsatisfactory. For example, he adheres to MacDougall's instinct theory, regardless of the findings of anthropologists which suggest the possession of very diverse 'instincts' by different societies. His physiological and cognitive psychology takes no account of the experiments or theories of the Gestalt school, or the discoveries made with the electro-encephalogram. In spite of Lashley's work he still appears to accept the synapse theory of learning and the hypothesis of inhibition by drainage. He argues for interactionism, as against psychophysical parallelism, apparently unaware of the possibility of a double aspect theory, or of Köhler's notion of isomorphism, which may resolve the controversy. While it is remarkable that a mathematical physicist, an educationist and a leader in world affairs should be so widely read in psychology, one cannot help feeling that he should have recast his psychological material very much more radically since 1921 than he has done.

P. E. VERNON.

Received also:—

A. J. Ayer, *The Foundations of Empirical Knowledge*, London, Macmillan & Co. Ltd., 1940, pp. x + 276, 10s. 6d.

D. W. Gotshalk, *Metaphysics in Modern Times: A Present-Day Perspective*, Chicago, Chicago University Press; Cambridge, University Press, 1940, pp. xi + 110, 9s.

G. H. Hardy, *A Mathematician's Apology*, Cambridge, University Press, 1940, pp. 93, 3s. 6d.

Sir C. Sherrington, *Man on his Nature* (The Gifford Lectures, Edinburgh, 1937-38), Cambridge, University Press, 1940, pp. 413, 21s.

R. E. M. Harding, *An Anatomy of Inspiration*, Cambridge, W. Heffer & Sons Ltd., 1940, pp. xiii + 118, 4s. 6d.

F. H. Heinemann, *Essay on the Foundations of Aesthetics* (*Analysis of Aesthetical Form*), Paris, Hermann & Cie., 1939, pp. 49.

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J. M. Murry, *The Betrayal of Christ by the Churches*, London, A. Dakers Ltd., 1940, pp. 191, 5s.

Sacred Books of the Buddhists, Vol. XI: Book of the Discipline, Part II, edited by Mrs. Rhys Davids, London, H. Milford, 1940, pp. lii + 430, 10s. 6d.

Plato: Selected Passages, chosen and edited by Sir R. Livingstone, London, H. Milford, 1940, pp. xxiv + 220, 2s. 6d.

M. Versfeld, *An Essay on the Metaphysics of Descartes*, London, Methuen & Co. Ltd., 1940, pp. 192, 7s. 6d.

F. H. Heinemann, *David Hume: the Man and his Science of Man* (containing some unpublished letters of Hume), Paris, Hermann & Cie., 1940, pp. 67.

H. H. Price, *Hume's Theory of the External World*, Oxford, Clarendon Press, 1940, pp. 228, 15s.

W. T. Jones, *Morality and Freedom in the Philosophy of Immanuel Kant*, London, Oxford University Press, 1940, vii + 178, 8s. 6d.

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E. L. Thorndike, *Human Nature and the Social Order*, New York, The Macmillan Co.; London, Macmillan & Co. Ltd., 1940, pp. xx + 1019, 18s.

L. Wood, *The Analysis of Knowledge*, London, G. Allen & Unwin Ltd., 1940, pp. 263, 12s. 6d.

B. H. Bode, *How We Learn*, Boston, D. C. Heath & Co.; London, G. G. Harrap & Co. Ltd., 1940, pp. 308, 8s. 6d.

A. J. Mavrogordato, *The Structure of Civilisation*, London, Heath Cranton Ltd., 1940, pp. 64, 6s.

E. M. White, *Woman and Civilisation*, London, J. Bale & Staples Ltd., 1940, pp. 62, 2s. 6d.

E. G. Chambers, *Statistical Calculation for Beginners*, Cambridge, University Press, 1940, pp. 110, 7s. 6d.

G. G. Coulton, *Europe's Apprenticeship: A Survey of Medieval Latin, with examples*, London, T. Nelson & Sons Ltd., 1940, pp. 288, 8s. 6d.

F. M. R. Walshe, *Diseases of the Nervous System*, Edinburgh, E. & S. Livingstone, 1940, pp. xiii + 288, 12s. 6d.

Philosophy and Phenomenological Research: A Quarterly Journal, Vol. I, No. 1, Sept. 1940 (official organ of the International Phenomenological Society), edited by Marvin Farber, Buffalo, The University of Buffalo, pp. 126, $1.00, annual subs. $4.00.

VII.—NOTES.

J. H. MUIRHEAD, 1855-1940.

With the death of John Henry Muirhead at the end of last May there passed away the last representative philosopher who had drawn inspiration as pupil from the fathers of late nineteenth-century Idealism in Scotland and England, from Edward Caird and T. H. Green. And yet up to the end of his long life Muirhead retained such a youthful vigour of mind and vitality of spirit that one could not think of him as merely an aging survivor of a school that, unexhausted as its influence still is, has already taken its place in the history of British philosophy.

Born in 1855, the third of four sons of a Hamilton lawyer, Muirhead lost his father when only two years old. His mother later moved to Glasgow for the better education of her sons, and the boy passed from the Glasgow Academy to the University at the age—premature, as he always recognised—of fifteen. Edward Caird had already held the Moral Philosophy Chair there for four years and was already beginning to exercise the magistral influence which a generation of Scottish students was to acknowledge. Muirhead remained six years at Glasgow before leaving for Balliol with the coveted Snell Exhibition, and among the enduring friendships he made the names of Henry Jones, J. S. Mackenzie, and John MacCunn may be mentioned. With the first of these he was fifty years later to write the life of Caird, whose philosophy as it was the earliest remained probably the most lasting influence upon his own thinking.

At Balliol, Jowett, Green, and R. L. Nettleship were the potent personalities, and for them all Muirhead felt an unstinted devotion. He was *proxime accessit* for the Gaisford prize in 1878, and next year returned to Glasgow to become assistant to the Professor of Humanity. But though in the six years he was to spend there he rose to be senior assistant, the teaching of the classics was never congenial to him, although his Oxford Chancellor's Prize Latin Essay, 1879 (on the Greek and Roman imperial organisation), showed he had the requisite scholarship. The renewed contact with Caird and other friends was probably the most valuable experience in these years. In a footnote in his book on Caird he recalls as marking an epoch in his own life an occasion on which Caird brought to a meeting of a college society a chapter from the MS. of Green's *Prolegomena to Ethics* to read with his own comments.

In 1885 Muirhead left Glasgow for London, to resume the study of philosophy and theology at Manchester New College, with some idea of becoming a Unitarian minister. But though he retained through life a profound religious faith in the moral order of the Universe and in the Christian values it never led him into intimate association with any Christian denomination. In London he came to know James Martineau and Stopford Brooke among many others, lectured for a time at the Royal

Holloway College and in University extension work, and became one of the founders of the London Ethical Society. In 1888 he became editor of the *Library of Philosophy*, a position he held up to his death fifty-two years later. No one could have been better fitted for this task, and no one could have discharged it with greater diligence or a more catholic sympathy. Muirhead's rare gift of appreciation made him indeed the ideal sponsor and recommender of the work of the varied and distinguished thinkers of half a century, British, American, and continental (they included Bergson, Croce, Varisco, Radhakrishnan, N. Hartmann), whose works the Library was to present to the English public.

His opportunity to exercise his teaching gift came with his appointment in 1897 to the Chair of Philosophy at what was to become three years later the University of Birmingham, a position he held until 1922. Here he speedily won and kept the affection and regard of pupils and colleagues, and his influence was not confined to within the walls of the University. In those days there were influences both in the city and on the college councils for which philosophy, and idealist philosophy at that, counted for little. Idealism in almost any sense of the word was suspect for them. Fortunately Muirhead's great gift of sympathy and understanding, his strong sense of humour, his capacity for co-operation with men very different from himself in outlook and temperament, most of all perhaps his sheer goodness of heart, soon won him recognition from those to whom his own subject was a closed book ; and he found from the first a Principal and congenial colleagues whose esteem he returned. To the varied activities of an expanding civic university he made a full contribution. He was not least interested in the development of its extra-mural work, and gave unsparingly of his time and thought to assist the expanding Workers' Educational Association. After his retirement he was still a keen participator in the week-end and summer schools organised by this and kindred bodies, throwing himself as zestfully into the social and recreational side of the gatherings as into the giving of a lecture or the leading of a group discussion.

The quality and bent of Muirhead's mind was well brought out in college meetings and committees. There he was always the conciliator ; as a partisan he was almost more a liability than an asset, for, as a colleague remarked, " the worst of having Muirhead on your side is that he will always put the other side's case so much more sympathetically than they can themselves ". This trait may have been sometimes exasperating to those who liked to force decisions through regardless of resulting rifts and fissures, and to whom conciliatoriness is always a mark of weakness ; but it was of course simply the inevitable expression of his philosophic faith, resolute to integrate rather than to divide and to find the greater truth in the more integrative opinion. So too at the philosophical congresses which he enjoyed so keenly almost up to the end of his life. When in discussion he rose to expose what he took to be some fatal positivist error with the defiant " Now, I'm out for blood ! " not the most lonely philosophical heretic needed to feel that this indicated a war *à l'outrance*.

Muirhead had married in 1892, but his wife, a sister of the late Graham Wallas, fell seriously ill in 1911, and until her death eleven years later the radiant mind that had brought so much happiness to their union was almost uninterruptedly obscured. No one who knew him first in these years could have imagined that he was bearing so great a private sorrow, so gallantly did he sustain and so unselfishly conceal it.

After his retirement Muirhead paid two visits to America, during the second and longer of which (1925-28) he held the Mills lectureship at the University of California. He immensely enjoyed his sojourn at Berkeley, and made friendships there which added much to the happiness of his later years, culminating in his second marriage in 1927 to a former pupil of his own. Shortly after their return to England a year after, he and his wife moved from his Warwickshire home to a new one at Rotherfield on the South Downs, and there he spent the Indian summer of his life, for his last eleven years must have been some of his happiest as they were certainly not his least productive. There he kept open house for visitors from all over the world, welcoming friends young and old, and answering with unflagging patience and courtesy requests for advice and assistance from every sort of importunate petitioner. He had always loved the sights and sounds of the country, and country walks with his friends were a constant delight to him. All these years he kept to a strenuous time-table of work, four hours in the morning and three in the evening, winter and summer. Even on the day of his death he was busy with notes for a book-review. It is little wonder that his output both of books and philosophical papers was so extensive. He was elected a Fellow of the British Academy in 1931.

As a writer Muirhead had made his *début* in 1892 with *The Elements of Ethics*, still the most widely read of his books, which, revised and enlarged to meet the challenge of later and opposed doctrines, passed through four editions up to 1932, and had readers as far away as Japan. (Muirhead used to tell with relish of the trouble incurred by a Japanese teacher who used it as a text-book, because of a remark which was misinterpreted as an apology for tyrannicide.) This first book indicated where his master-interest lay. It was the moral and social implications of Idealism that occupied his mind more than its logic or its metaphysical structure. In regard to these he was content in the main, apart from the fundamental convictions he owed to Green or Caird, to follow his elder and more eminent contemporaries, Bradley and Bosanquet, though never uncritically. For the latter of these especially he felt not only profound respect but warm affection, and the editing of a collection of his letters (*Bernard Bosanquet and his friends*, 1935) was a labour of love. But if metaphysics came second to ethics with him he was not the less insistent on the importance of vindicating the claim and status of metaphysical speculation, and if there was a philosophical opinion before which his sympathy stopped short it was that of the Logical Positivist. Five years before his death he was characteristically wondering "whether it is not time to rally the younger people to the idea of a speculative philosophy that would drop slogans for itself and nicknames for its enemies . . .".

His dominant interests were shown in a series of volumes and papers issued over a period of forty-seven years from the first book to the last published work, the Herbert Spencer Lecture on *The Man versus the State as a present issue*, delivered in Oxford in 1939. They include *Philosophy and Life* (1902); *The Service of the State* (1908), lectures on the political teaching of Green; *German Philosophy in relation to the War* (1917), a timely corrective of prejudices current both then and to-day; *Social Purpose* (1918) (with Sir H. J. W. Hetherington); *Rule and End in Morals* (1932), in which he came to grips with recent Oxford discussions on the ethical problem. He was a frequent contributor to MIND and to the Aristotelian Society and his articles range over a variety of topics, from the knowledge of Space to the doctrine of the General Will.

But probably more valuable than any of his works were his interpretations of his friends or teachers, or of past philosophies. His *Coleridge as Philosopher* (1930) did much to rescue a great name from oddly prolonged neglect by philosophical critics: and the study that followed it (1931) on *The Platonic Tradition in Anglo-Saxon Philosophy* was an admirable retracing of the lineage of British Idealism. The more definitely biographical works already referred to, with other shorter tributes to the friends and contemporaries whom he had survived, show *pietas* salted with criticism, the former, however, usually predominating.

Mention has been made of Muirhead's labours as editor of the Library of Philosophy. He had done a service of another kind when as joint-translator he had made available for English readers Zeller's *Aristotle and the earlier Peripatetics* (1897). And in 1924-25 he was responsible as editor (and contributor) for the two highly interesting volumes of *Contemporary British Philosophy*. Probably no one could have succeeded so well in extracting these valuable personal statements from their, at least sometimes, reluctant authors. Finally, mention should be made of the active interest which he showed in the Institute of Philosophical Studies from the time of its inception.

Shortly after the outbreak of the war he and his wife adopted two child refugees from Austria into their household. The children must have made heavy inroads into the time and quiet of an octagenarian who had become increasingly sensitive to noise. But he rose to the occasion with a new and characteristic zest; for (as he wrote), "if I am ever to have a second childhood it is time at 84½ that I began practising". Certainly he never lived to know senility: and his friends will think of him as illustrating Stevenson's interpretation of the old Greek saying that those whom the gods love die young. "For surely, at whatever age death overtakes the man, this is to die young."

JOHN W. HARVEY.

MIND ASSOCIATION: REPORT OF ANNUAL MEETING.

THE Annual General Meeting of the Mind Association was held on 5th July, 1940, in Trinity College, Cambridge, the President, Prof. C. D. Broad, in the chair. The Treasurer's report was read and adopted. Prof. C. D. Broad was re-elected President for 1940-41 and the Vice-Presidents were re-elected. Mrs. Kneale was elected Secretary for the year 1940-41. On the recommendation of the Executive Committee the President was empowered to make arrangements to fill the office of Treasurer in case of emergency. It was decided to hold the next meeting in Cambridge in July, 1941.

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The following is the full list of the officers and members of the Association :—

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